Bridging the GAP from Destruction to Rehabilitation for Balakot Town, Pakistan

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ABSTRACT

The Earthquake of 2005 in Pakistan destroyed more than 600,000 houses in the area covering 30,000 square km, equal to the size of New Zealand. Most of the houses were located in the rural areas i.e. on the mountains or inside the deep mountainous valleys. However, the three major urban settlements in the area, the towns of Balakot, Muzafferabad and Bagh were badly affected. The ill-fated town of Balakot with estimated population of 37,000 was destroyed completely. 5000 people died and 95% of the infrastructure facilities were demolished. Later, the national and international consortium of specialists confirmed that the town is located on two major fault lines, running parallel all along the town. It was also confirmed that the epicenter of the 2005 Earthquake in Pakistan was 10 km deep beneath the town of Balakot. Interestingly, originating from central Asia region, the fault line enters Pakistan from the North West and pass through the towns of Balakot, Muzaffarabad and Bagh, then continues into Hindustan (India). To provide safe living environments for the affected towns, Urban Strategy was formulated by the Earthquake Reconstruction and Rehabilitation Authority. Transitional Housing Project and City Improvement Plan also became parts of the Urban Strategy to provide a reasonable, reliable and decent residential solution.In this paper, the interventions and strategies prepared and implemented to rehabilitate and reconstruct the town of Balakot and its peripheral areas after the devastating earthquake of 2005 is highlighted.

Keywords:
Earthquake; Destruction; Epicenter; Fault Line; Urban strategy; Balakot; Pakistan

1. Introduction

The Earthquake of 2005 killed 73,338 people and injured 128,309 people in the nine affected districts of Pakistan, see Figure (1), covering approximately 30,000 sq km area almost equal to the size of New Zealand, see Figure (2). The earthquake damaged and destroyed more than 600,000 houses, 6,298 educational institutions and 782 health institutes in the province of Khyber Pakhtunkhawa (KPK) and in Azad Jammu and Kashmir (AJ and K). Some 84 percent of the total housing stock was damaged or destroyed in AJ and K, and 36 percent was damaged or destroyed in Khyber Pakhtunkhwa Province (KPK). About 90% of the destroyed or damaged houses were in rural areas [1].

The damage in the earthquake affected areas was far-reaching. Public buildings, private housing, infrastructure, social services, livelihoods and businesses were all extensively damaged or destroyed. Urban areas were devastated while towns, like Balakot, were completely destroyed, see Figure (3). To date, the overall cost of relief and reconstruction efforts associated with the earthquake is estimated to be around 6.0 Billion U.S. Dollars (USD).

Private housing suffered the most extensive damage, followed by transport, education, agriculture and livestock.

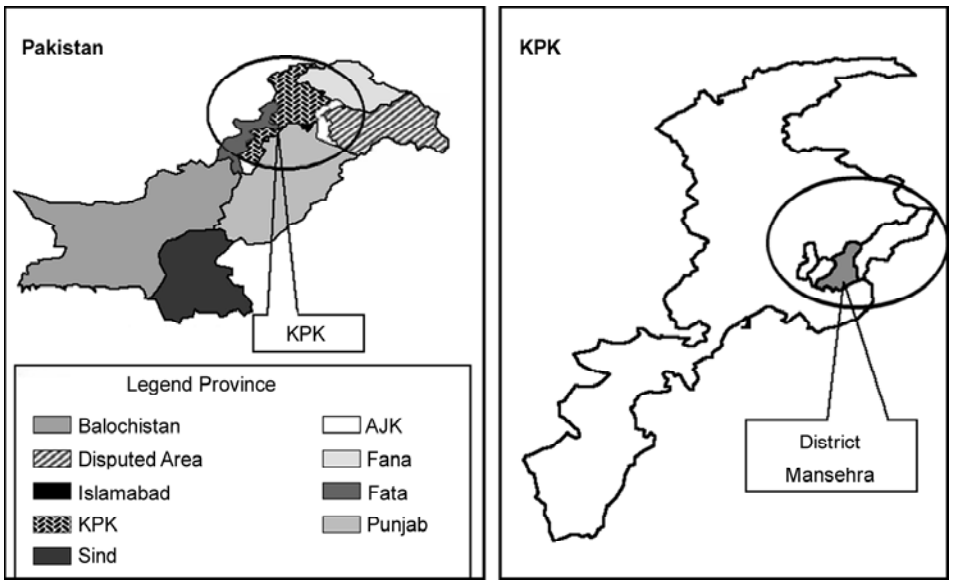

Figure 1. Earthquake affected area.

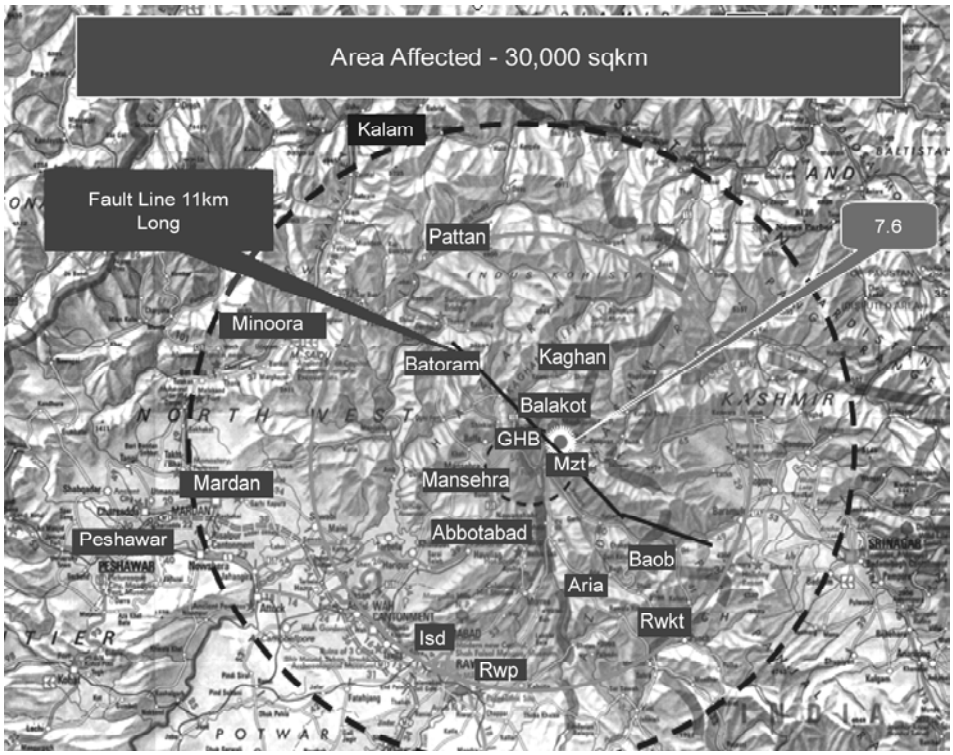

Figure 2. Nine affected districts in the 2005 earthquake in Pakistan.

2. The Federal Response

In response to the earthquake, the Government of Pakistan created two entities:

The Federal Relief Commission (FRC) was formed in October 09, 2005 to provide relief assistance to the earthquake victims and to monitor and coordinate the overall relief effort.

The Earthquake Reconstruction and Rehabilitation Authority (ERRA) was formed on October 24, 2005, as an autonomous authority (responsible for reconstruction, rehabilitation, and development of the areas affected by the earthquake of October 8, 2005. ERRA Ordinance: Section 3). The jurisdiction of ERRA covers the earthquake damaged areas of Pakistan in Khyber Pakhtunkhawa (KPK) and State of Azad Jammu and Kashmir (AJ and K).

Figure 3. Destroyed old Balakot town 2005.

The FRC was dissolved on March 31, 2006, and a core group of personnel was merged with ERRA. All residual relief activities that were still in process were transferred to the Transitional Relief Cell (TRC) of ERRA.

3. The Recovery Task

The significant task of *ERRA* is to provide the leadership, financial assistance, development framework, and coordination needed to enable the earthquake affected areas to rehabilitate lives, communities, public services, and social structures to a level of quality better than that existed before the earthquake. Further, it sought to complete the rebuilding in a reasonable period, with minimal disruption and cost [2].

4. ERRA Philosohy

The basic principle governing the Reconstruction and Rehabilitation process is to implement the task at the local level by the Provincial/State Governments through the respective local governments with the participation of regional community. ERRA and the Federal Government of Pakistan have to assist the local governments in planning, policy making, resources, technical assistance, coordination, and monitoring.

5. Balakot Town (Red Zone) Rehabilitation/ Reconstruction Program

Balakot Town is Tehsil headquarter of Tehsil Balakot, with 12 Union Councils. Prior to the earthquake of October 8, 2005, Tehsil Balakot served a population of 214,630 persons on an area of 2,376 square kilometers. Balakot town, comprising two Union Councils and a portion of another Union Council is surrounded by mountains and is close to Indian-held Kashmir in the East and China in the North. The Earthquake destroyed almost 95% of the infrastructure of Balakot Municipal area, spread over 1400 acres [3].

6. Urban Rebuilding Stages

The Table (1) below, lists the key stages in the Urban Rebuilding process. These stages are not

Table 1. Destruction old Balakot town 2005.

No.	Stage	Description	Comments
1	Rubble removal	Clear off all debris including debris created by demolition. This action sets the starting site for rebuilding.	Technically not part of rebuilding, it is a prerequisite to initiate rebuilding.
2	Creation of a hazard map	A mapping of the land area of the city that accurately delineates boundaries and quantifies the magnitude of hazard which the city is likely to face all points within the city.	The hazard map is the technical basis for creating the zoning map and zoning code. The hazard map does not tell where one can rebuild. It only tells the conditions for rebuilding.
3	Undertaking a building damage assessment survey	A quantified definition of all physical structures in the city as to their soundness and degree of damage.	This survey constitutes the initial base-line data and provides the basis for dealing with transitional shelters and other temporary building needs.
4	Adoption of a zoning map and zoning code	This is the basic land use document. It is the public policy decision of what can be built, where and to what standard.	This document has political dimensions to it. It must be determined by consensus, based on the best technical data available.
5	Adoption of a building code	This code tells the standards to which buildings must be built under various conditions.	This code is driven in great part by the zoning code because the zoning code is based on the level of hazard to be protected against.
6	Determine new land areas needed to contain the city	In some cities, additional land will be needed in order to rebuild a city sufficient to accommodate the resulting population needs. This new land needs to be identified before the planning function starts.	This determination must be made before the town plan can be drawn.

Table 1. Continued...

No.	Stage	Description	Comments
7	Develop a final damage definition (damaged areas) and site status (non damaged areas) of the city	This definition sets the baseline and strategically defines the starting point of the rebuilding process.	This definition is a collective process.
8	Determine the shared vision of what the rebuilt city should look like in future.	A description of how the city will look, feel and function after it is rebuilt.	A process for developing a shared vision is a prerequisite for development of a successful town plan.
9	Create the basic land use plan for the rebuilt city	This plan defines the organization and layout of the rebuilt city.	
10	Create the component attributes (sector definitions) for the rebuilt city	This stage is where the design, specifications, and content of each of the sub-plan subjects are fitted into the total Town Plan. This is where this component pieces are matched and brought together as a unified whole.	The Sub-plans need to be considered as a whole and properly structured into the town plan.
11	Integrate into the physical redevelopment infrastructure of the town plan the social infrastructure attributes.	Physical and Social Infrastructure cannot be considered as mutually exclusive of one another. The Physical and Social Infrastructure have to be synchronized with one another.	Close coordination between the Physical Infrastructure Sector and the Social Infrastructure Sector within ERRA.
12	Create the final town plan	This plan defines the structure, design, character and attributes of the city and the goals, policies and procedures for getting there.	The plan should have a 10-30 year vision, divided into annual plans.
13	Create the town plan implementation design and address the time frames, costs, budget availability, resource needs, annual plan specifications and other details necessary for a staged and effective implementation of the Town Plan	This is a detailed implementation strategy for turning the town plan into reality. This stage defines the administrative management for the Town Plan.	The main effort here is deciding the annual plans, the financing patterns and trading off expectations for available resources.
14	Create the local means to implement the Town Plan	The respective municipal authority lacks the capacity and resources to effectively implement the town plan in its true spirit. The capacity of these authorities has to be enhanced.	One of the initiatives that will be used is to facilitate implementation of the town plan by placing a Management Unit within each Municipal authority.
15	Acquire requisite land interests	As deemed necessary by the town plan, additional land will have to be acquired by the respective Provincial / State Government.	One cannot underestimate the problems that will occur regarding land issues and there may have to be new procedures to deal with land issues.
16	Provide Medium Term Housing to affected Population	Prefabricated houses will be provided both in AJ&K and KP to the affected population.	EVFs and landless people will also be eligible to apply.
17	Implement the town plan	Implementation is the process of making the Town Plan a reality. Implementation is the actual work effort of rebuilding the city. Implementation must be done in stages and through annual work plans; will take years to fully accomplish; will involve revisions of the town plan; and, will involve tremendous coordination of resources.	All stages before this point are preparation for the rebuilding encompassed in the implementation.
18	Conduct monitoring, evaluation and readjustment activities to keep the town plan on track.	This is the oversight process that provides the information and understanding necessary for management to keep the rebuilding on track and accomplishing the community's intent.	This process is important for keeping control, accountability and transparency for the whole city in its rebuilding effort.

necessarily sequential activities. These stages may have interdependent priorities, will often have to be phased with one another, and might have significant overlap. For purposes of ERRA's activities, each of the stages should have its own accomplishment plan.

7. Urban Devlepment: Balakot Projects

The seismic studies by the Consortium of national and international experts [4] revealed that multiple fault-lines are crossing through the town, making it highly susceptible to future seismic hazards, thus it was declared as Red Zone, see Figure (4). The Federal Government in consultation with Provincial Government decided to relocate entire Old Balakot (Red Zone) population (approximately 5000 families) to a new seismically safe location.

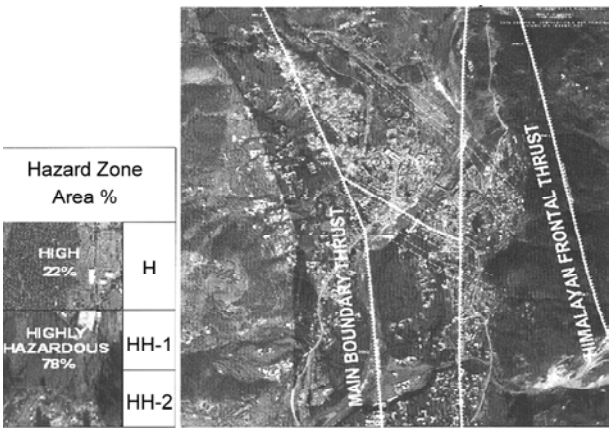

Figure 4. Map showing fault lines passing through Old Balakot town.

In pursuance to the decision of the Government, the strategy for Balakot and surrounding area was formulated at the cost of *USD* 300 Million. Since the time period for development of new town was stretched to 4-5 years, it was decided to provide in-situ, transitional facilities to the local residents of old town and health, education facilities to neighboring Union Councils dependent on the facilities of the doomed town, old Balakot (approximately 9,000 people). As a result, the Transitional Shelters Project, Old Balakot Improvement Plan and Old Balakot Peripheral Area Development Plan were conceived and put to implementation [5], see Figure (5).

8. Survey

The initial damage survey of the area i.e, numbers of destroyed houses and shops, injured, dead, orphans, widows, damage to livestock and other businesses was carried out by the consultant hired by *ERRA*. However, each segment was resurveyed later through the District Administration and local community representatives to validate the results.

9. Interim Relief

About 6,000 winterized tents, blankets, warm clothing, food items and a mobile field hospital were

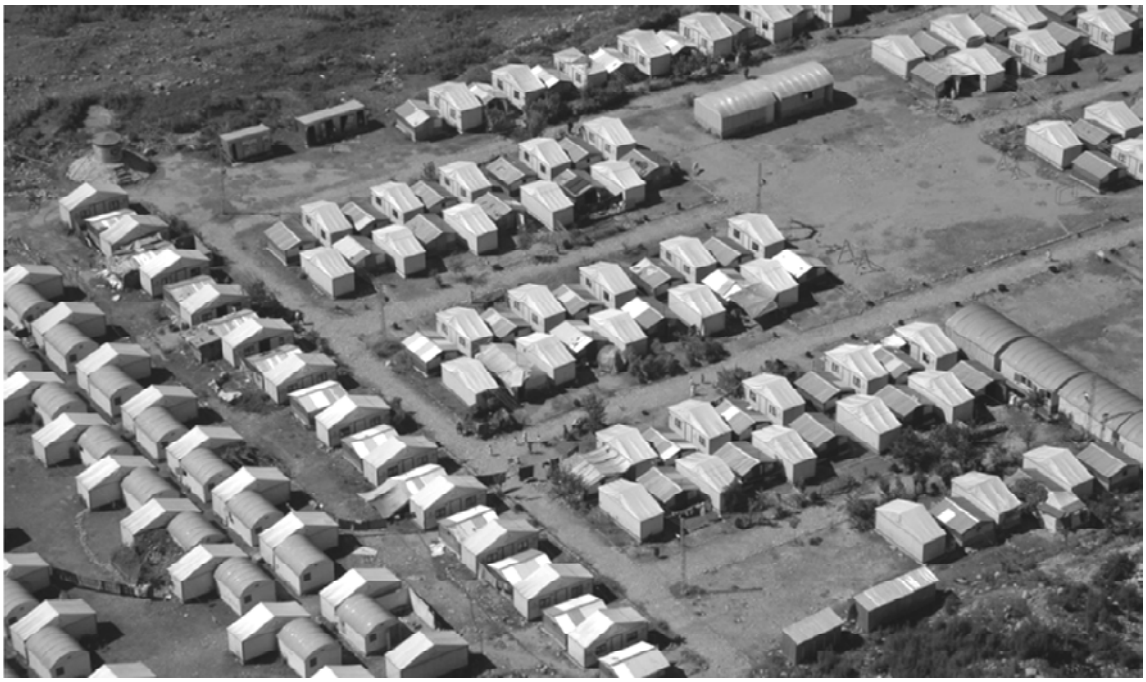

Figure 5. Tent village at Jabba sheep farm (Old Balakot).

provided to the affected people of Balakot. The Rescue Missions were also mobilized, removal of debris and clearance of roads/streets remained in progress for the first three weeks after the disaster.

10. New Balakot City Development Project

To provide top-of-the-line urban facilities, an urban development strategy with the dominant theme of "Build Back Better" was formulated. The shared vision of this strategy is to achieve all goals of urban planning as enumerated in the Pakistan Vision 2030. It addresses the employment, tourism and strategic aspects and revolves around a concept of rebuilding a self-sustaining city which would be environmentally safe and seismically sound. The project was planned initially on 58 squares of land. Later, due to multiple complications emerging while implementing the master plan on ground, the project was curtailed to 43 squares of land. The total cost of the project excluding the cost of land is PKR 12 Billion (USD 200 Million), whereas the land was purchased for PKR 1.5 Billion (USD 25 Million).

The project is divided into two packages:

a) Infrastructure development consists of construction of roads, streets, sewerage, water schemes, electrification and natural gas facilities, etc.
b) Construction of buildings including schools, hospitals, mosque, fire station, civic centre, etc, see Figure (6).

11. Challenges Faced by the Management

The development works on roads, streets, sewerage and water supply is 52% completed. Development of New City for the affected people of a remote area such as Balakot town is a challenging task for the management in terms of:

a) Finances i.e. smooth flow of funds.
b) Convincing locals to understand the hazards of living in highly hazardous territory (Red Zone) and shifting to a new locality.
c) Acquisition of land for the development from the private owners i.e. taking possession of the land, even after payment of the value of their properties as compensation is very difficult due to emotional attachment of the actual owners to their land holdings and other properties.

This aspect of the society pertaining to people living in these areas is a lesson learnt for the future planners dealing with projects like Balakot Development Project. Eviction of local residents from the acquired land is one of the main irritants in the development of a New Balakot City.

Hence, the pace of the project is slow due to many uncertain situations. For example, owners of the actual property are posing hurdles in vacating acquired land despite receiving generous amounts as land compensation. The authority is pursuing the

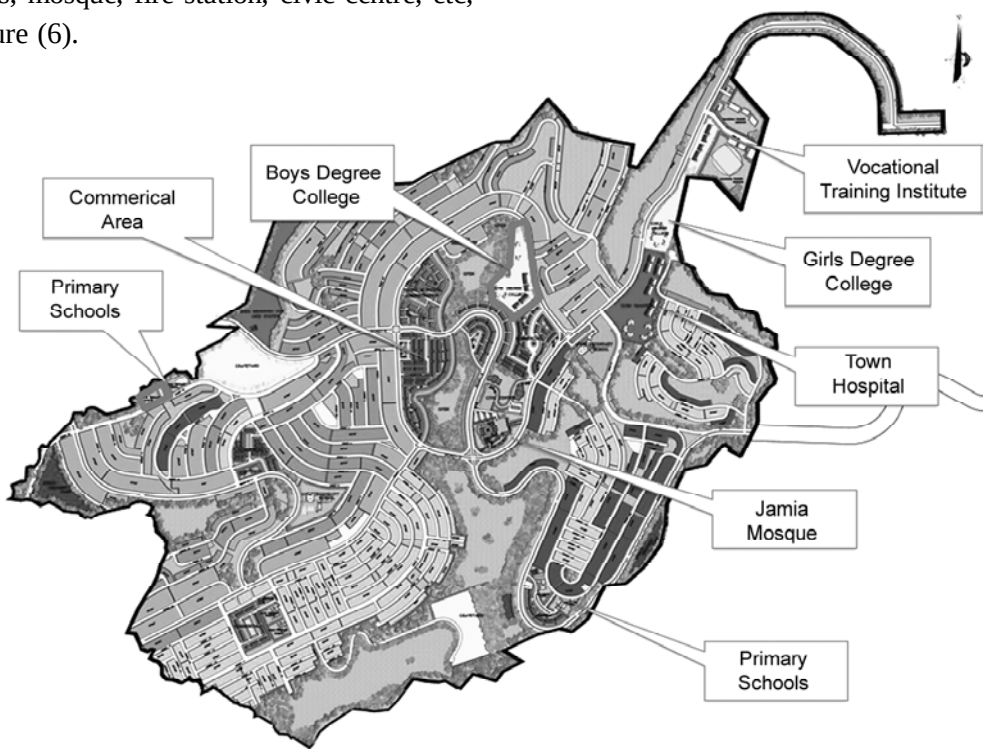

Figure 6. Master plan, new Balakot city.

locals through district administration to vacate the sold property, but the process is quite slow. Due to financial constraints in the country, sometimes the availability of funds is also a difficult proposition. However, the authority is adamant on following the guidelines drawn to complete the project, and it is expected that the town will be developed in another 3-5 years from 2011. Until that time, components of Transitional Housing, Old Balakot Improvement plan, including schools project and Old Balakot Peripheral Development Projects were planned and started to provide the basic necessities to the affected people of Old Balakot and surroundings.

12. Transitional Housing Project

The first priority after the interim relief phase and after the decision of relocating city to new locality was a need for housing solution to the residents of Red Zone, as permanent construction in Balakot Town Red Zone was prohibited. To provide seismically safe and decent living, a project of 5102 pre-fabricated houses was proposed and launched for the affected people of Red Zone (Balakot Town), see Figure (7). Basic Government facilities such as hospital and other government functionaries were also planned and housed in the transitional facility. The total cost of the project is USD 48.382 Million. Approximately, 98% of the project is completed and residents are living a comfortable life. Besides, this USD 2500 was also paid to every household in Red Zone. People without houses before earthquake were also accommodated in this facility. The facility was extended to every household living in Old Balakot Town (Red Zone) regardless of their status. Destroyed houses outside Red Zone were also paid the same amount as subsidy [6].

13. Midcourse Corrections - Innovation in the Designs

The initial, approved design for the Transitional House has two rooms, one kitchen and one bathroom covering 41.34 square meter covered area. However, in some areas people had less or little piece of land available for the house. ERRA, immediately innovated one-room sets to two-rooms sets on 13.38 square meter and 27.87 square meter covered area, keeping in view the demand of the locals, thus accommodated most of the affected people.

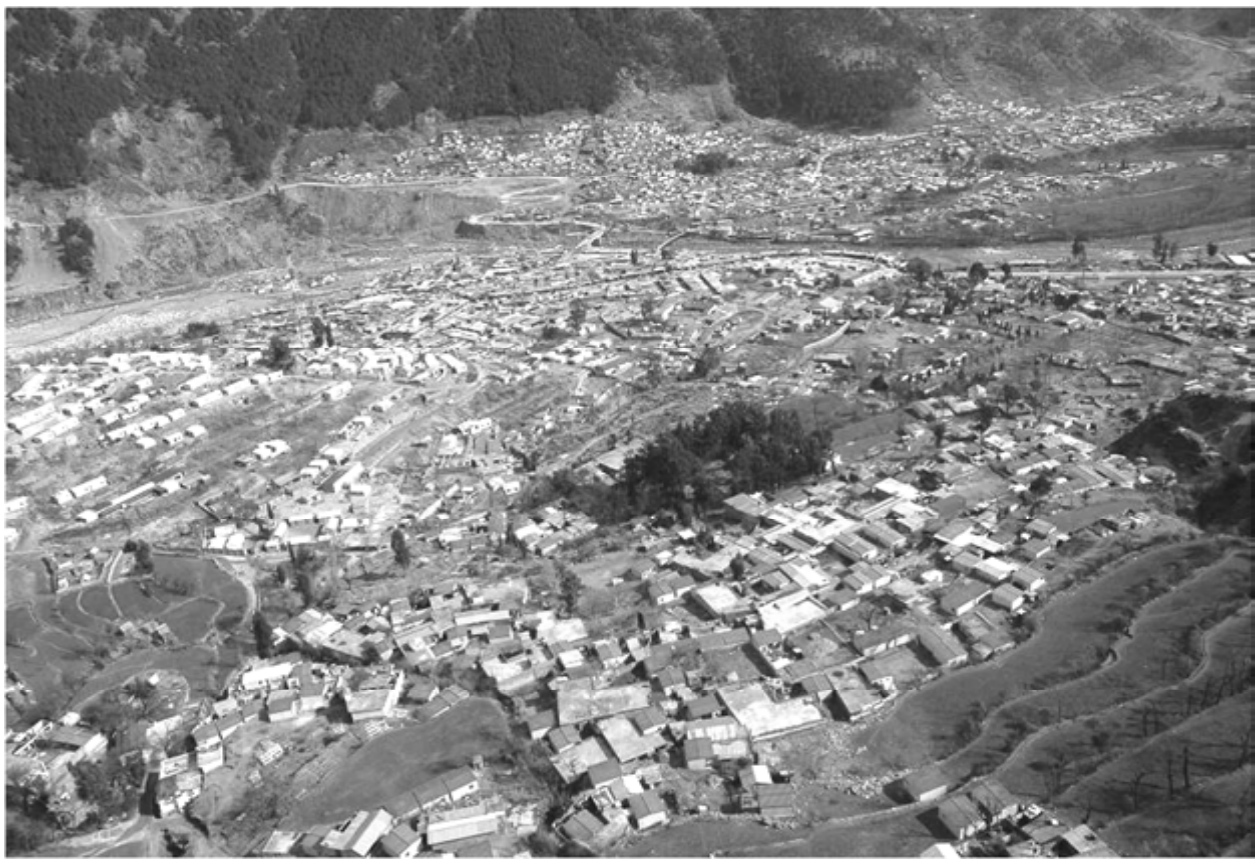

Figure 7. Old Balakot town after construction of prefabricated houses.

14. Case Studies

Mrs. Mali Begum, widow of Wali Umer resident of Muzafferabad, lost her husband in the Earthquake of 2005, leaving behind two children and a destroyed house. The mother and a young unmarried brother were also living with Wali Umer. After the Earthquake, the Transitional wing of ERRA, provided 41.34 square meter covered area house to the mother of Wali Umer. Mali Begum requested ERRA for the provision of a house closer to her father's as she was not feeling comfortable living with the brother of her deceased husband. Unfortunately, the plot closer to her father's house was measuring only 20.43 square meter.

Transitional Housing wing of ERRA with the help of the consultant, innovated a design of one bedroom and one bathroom set of a Transitional House for the affected family having less than 41.34 square meter of area. Mrs Mali Begum is now living an independent life, and her children go to school for better future [7].

Mr. Khuda Baksh, 75 years old, resident of Mohallah Upper Garlat, Balakot was living happily in a combined family house with three married sons and eight grand children. The devastating earthquake took away Khuda Baksh's three married sons leaving behind three widowed daughters-in-law and eight orphan grand children, with no shelter on their heads. The family got shifted to a tent village at first. The shock of this accident was so intense that Khuda Baksh lost his ability to speak. One of the sons of Khuda Baksh, who was unmarried and had gone to Abbottabad on that unfortunate day also survived.

After the survey, Transitional Housing wing of ERRA provided four independent sets of two rooms houses one for each widow. In addition, they received a rural housing subsidy of Rs 175,000 (2500 USD) and will also get residential plots in New Balakot City on its completion.

Mr. Khuda Baksh is quite satisfied and thankful to ERRA for its intervention in Reconstruction and Rehabilitation of Balakot for saving his pride and the future of his orphan grand children.

The project of transitional housing is totally funded by following donors, see Figure (8):

a) Saudi Public Assistance for Pakistan Earthquake Victims (SPAPEV)
b) International Organization for Migration (IOM)

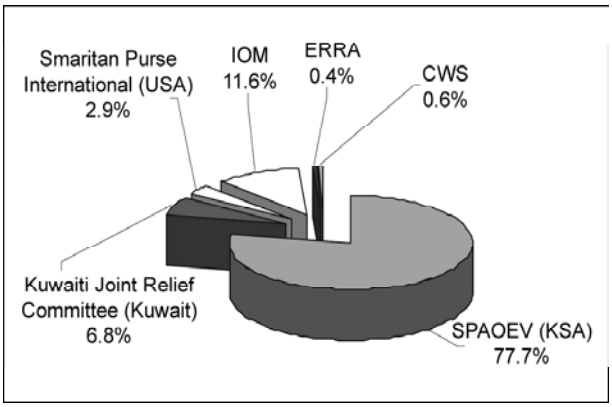

Figure 8. Contribution made by international donors and government of Pakistan.

c) Kuwait Joint Relief Commission (KJRC)
d) Samaritan Purse International (SPI)
e) Church World Service (CWS).

15. Old Balakot Improvement Project

Significance: To provide hygienically safe and environmentally sound transitional/interim living conditions to the residents of Old Balakot till the new Balakot City is developed, the project of new Old Balakot Town Improvement Plan was conceived and implemented. The aim of this project is to provide a better quality of life which is seismically safe and community friendly. The overall impact of the project towards the civic life is:

- **Removal of Debris:** This scheme has facilitated the other development works in the area as the debris of the destroyed buildings and structures was hindering the smooth flow of water channels, blocking of drains and giving a depressing look to the ill-fated town.
- **Roads and Tracks:** The improved roads and streets/ tracks have brought the life back to the normal. People move and travel from one point to another in their cars conveniently.
- **Improvement of Streets, Drains and Sewerage:** The streets, drains and sewerage system of the town have also been improved. Due to earthquake, the sewerage system in the town was badly damaged, the project has rebuilt all such damaged sewerage and drainage systems, see Figure (9).
- **Protection Walls/Flood Gabions:** In the rainy season, the fast-flowing water from the mountains would inundate the surrounding residential/ commercial areas in the Red Zone. By construct-

Figure 9. Improved streets and drainage, old Balakot town.

ing protection walls and flood gabions, the water has been channelized and used for irrigation or drinking purposes.

- **Drinking Water Schemes:** The Drinking water schemes were totally destroyed by the Earthquake. The people of the area had to travel long distances to fetch water for drinking, washing and bathing. Due to the intervention of this program, five water supply schemes have been extended towards Old Balakot residents. Every household now has the water connection which has made their lives much easier [8].

16. Peripheral Area Development Plan

To alleviate the suffering of population living in the surrounding or peripheral areas of Old Balakot relying on the education and health facilities of old Balakot, a project of peripheral development of Old Balakot at the cost of PKR 493 M (5.5 Million USD) was conceived and is under implementation. In this project, 20 km road, eight schools and three health facilities (Hospitals) have been planned to provide accessible education and health facilities, see Figure (10).

17. Social Impact of ERRA Intervention /Strategy

With 98% completion of seismically resistant prefabricated houses, offices, hospitals and schools in Red Zone of Balakot, people are now living in safe and protected environments.

People of Balakot Red Zone believes that the bnew houses are better than the old ones because of attached kitchen and toilet facility, which in most of the cases never existed.

Figure 10. Construction of government boys schools, old Balakot peripheral development project .

Due to the improvement plan of Balakot Town with cemented streets, link roads, drainage and protection flood walls/bunds, the people of the area feel much safer, and social and economic life affected by the Earthquake of 2005 has returned to normal.

The peripheral development plan of Balakot Town comprising 6 Union Councils will provide better health, education and communication infra structures facility to the locals who were previously using the facilities of Balakot Town. After the development of New Balakot City approx 5000 families will have top-of-the-line civic facilities available at their doorsteps. It will open venues of new commercial activities and a bright future for the residents.

Thanks to *ERRA's* intervention with an aim to Build Back Better, facilities provided so far and planned in the shape of developing new cities, it is expected that it will bring a revolution on the cultural and social values of the people such as awareness to construct their houses safe, consuming clean water, creation of hygienically safe environments and better education and health facilities.

The strategy of developing urban facilities and housing at one location will guard residents against any possible terrorist activities as planned cities and other facilities constructed under the strategy envisages this particular element.

18. Challenges

18.1. Managing Expectations

Expectations of Governmental assistance by the

affected people in my view are directly a proportion of the financial status of the people. It also differs from country to country and area to area. Balakot, one of the remotest towns of Northern Pakistan; bounded by mountains all around, and accessed through only one road is a low-income area for its residents. Expectations of the people from this area towards the authority working for their rehabilitation are very high. Blocking of roads, strikes by transport corporations and sometimes anti-government processions were seen after passing first year of disaster. The impetus of these events died down eventually, when the locals saw substantial development projects in their areas.

18.2. Capacity Issues

Due to difficult terrain, snow covered areas and lack of road infrastructure; it is very difficult to carry out reconstruction activities. Balakot town and surrounding areas are located on the most difficult terrain of Northern Pakistan. It took substantial time for the reconstruction authority to get mobilized properly due to the above factors [9].

18.3. Local Issues/Ground Realities

Proposals, designs and planning on papers is very convenient for the planners, while implementing the proposal and strategies on the ground is significantly difficult due to public issues, land ownership issues and financial constraints.

18.4. Sustainability and Maintenance

The projects under implementation require sustainability in terms of flow of funds and maintenance of aim, especially when the local population does not encourage the reconstruction model applied in their area.

18.5. Weather and Terrain Restrictions

The devastated Earthquake hit the most difficult terrain of Pakistan. A few areas where reconstruction work was to be carried out were between 16404 m to 26247 m higher than the sea-level. In such places, only three months are available for the construction works, due to heavy snow and rains.

18.6. Security Situation

Due to prevailing war against terror situation in Pakistan, especially in the Khyber Pakhtunkhwa (KPK) Province, where Balakot is situated, it is quite challenging for the Project Implementers (Program Managers) to carry out Reconstruction and Rehabilitation activities.

19. Lessons Learned

This experience has had many lessons that could be useful for future planners:

- A dynamic organizational structure is required with centralized control and a decentralized implementation mechanism to ensure that the equitable and flexible policies are implemented.
- All stakeholders need to get involved in policy planning and critical decision-making to ensure ownership by all that makes implementation easy. The procurement system, financial management systems, planning systems and monitoring and evaluation systems need to develop in a customized manner to enhance efficacy.
- Coordination is a key element in success of the reconstruction. To coordinate activities and share best practices, structured mechanisms should be developed.
- Open, transparent and accountable systems are required for attracting donors' confidence.
- Critical programs need to be focused during reconstruction and, this indicates that such programs should be prioritized in advance. Different sources for reconstruction by donors, sponsors and the government need to be provided, and even though the design approvals and implementation is centralized, but the implementation should be decentralized to help meet timelines.
- Software interventions must be emphasized equally for building human resources capitals, ensuring better management and improving service delivery.
- Matters such as risk reduction, gender balance, environmental safeguards and social protection of vulnerable groups should be mainstreamed into all sectoral developments to achieve sustainable gains in long term.
- Alternative fast construction technologies should be encouraged right from the outset to meet the target objectives within the given timeline.
- A decentralized grievance redressal system is required to ensure speedy dispensation of justice for the affected people.

To avoid misperceptions, manage expectations and ensure effective dissemination of information, a well-thought-out and proactive communication strategy is very important.

There are some other lessons that are considered as strategic and operational lessons as well.

20. Strategic Lessons

To ensure that the strategy, planning and implementation are functioning in a right direction, at least one person from each program or project must stay within that program or project till its completion. Ambitious timelines and targets need to be avoided as they raise expectations unwarrantedly. Prioritization of sectors and activities should be in accordance with the needs, available resources and capacities. This would help to maintain focus on critical programs and avoid dissipation of effort. Owner driven and community owned development is beneficial for long term sustainability.

The media must be incorporated in all programs for the dissemination of information regarding all the activities to the general public in the country and particularly to the affected area inhabitants.

21. Operational Lessons

For sound planning and designing, a comprehensive damage assessment covering all socio-economic sectors and technical aspects is the most important one-time step that needs to be taken upfront before starting the reconstruction and rehabilitation activities. Also, information sharing together with vertical and horizontal coordination mechanisms foster organizational success. Documentation/maintaining and recording of all the events and correspondence made with the donors, sponsors and government offices must be prepared and maintained for references and institutional memory.

22. Conclusion

It is said that natural disasters cannot be stopped; however, due to better planning and management, the effect of natural disasters can be mitigated. The role of Disaster Management Organization is to create environments where human life is secure and safe, especially in the disaster-prone areas where natural disasters can occur. Through Risk Assessment of the area, we can conveniently earmark disaster prone areas and formulate better strategies to create safe environments prior to disaster. Through better Disaster Management we can manage skillfully and efficiently during the disasters and post disaster events. Through better communication we can communicate and manage the event of disaster in any area. The Balakot Improvement Plan is such an example of managing the disaster and bridging the gap, which has occurred due to disaster (Earthquake 2005) towards rehabilitation to provide better and safe living conditions.

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