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Title of the Paper:

TOWARDS A HOLISTIC ECO-DEVELOPMENTAL FRAMEWORK
FOR REDUCING VULNERABILITY OF TRADITIONAL RURAL
SETTLEMENTS AGAINST EARTHQUAKES IN SOUTH ASIA

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Introduction:

An alarming increase in the frequency and magnitude of ‘natural’ disasters has led us to reconsider disasters merely as events in question. Rather, these are now widely accepted to be the consequence of social vulnerability, which is the product of structural relationships in a given society. The main hazard events such as earthquakes only serve to trigger the disaster, which is already in making. (Blaikie, Cannon, Davis, Wisner, 1997, Gilbert, 1998)

This new perspective has also resulted in a considerable discussion among disaster researchers and practitioners on the relationship of disasters to development. Not only, disasters are understood for their impact on development, these are themselves a consequence of the local development process. As such, disaster management and development are inextricably linked, both affecting each other in one way or another (in fact the former in many ways is determined by the latter). (Cuny, 1983, Lewis, 1999)

Such a mutual relationship exists within and across various time periods with respect to the main hazard event in focus. On one hand, the existing processes of development before the hazard event affect the vulnerability, collectively for the whole community or for certain groups in particular (Anderson and Woodrow, 1989). On the other hand, not only disasters themselves but also their response decisions and the institutional structure to carry out these, influence the vulnerability in the long run. This makes vulnerability a dynamic and complex phenomena, deeply rooted in local context, shaped by existing skills and resources available, structural relationships within local communities (determined by cultural beliefs), power relations and institutional structures in place and most importantly, the accepted models/paradigms for disasters and development.

The existing models

Two main universally accepted models for development and disaster management are ‘economic growth’ and ‘command and control’ models respectively. The basic assumption behind both of these is an underlying duality and separation between ‘we, the experts’ and ‘they, the weak vulnerable communities’. Therefore the following assumptions are taken for granted:

1. ‘They’ are ‘poor’, ‘weak’ and ‘ignorant’
2. ‘We’ can decide what is best for ‘them’ and provide them with our time-bound recipes.
3. ‘We’ know their problems and can solve them based on ‘our expertise’.
4. We can ‘develop’ them and can make ‘disaster resistant communities’.

Importantly all these assumptions are as seen by the eyes of ‘we, the experts’.

However, going by the available statistics with us, the current systems for managing development and disasters based on these assumptions have not produced much difference

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1 There are some winners and many losers as a consequence of the development process. The winners are usually at the cost of losers, who become more and more marginalized and thus, vulnerable to approaching disasters.
on the ground, especially in the so-called ‘developing world’. On the contrary, disasters are increasing with each passing year. This leads us to examine the role and effectiveness of these models for development and disaster management. The best way to do it is to look in detail into the socio-cultural, economic and physical transformation processes taking place both preceding the natural hazard and after it that affect their vulnerability. It is important to assess the role of various decisions in creating these processes, both as part of normal development as well as management of specific disasters in focus.

The South Asian context

In this paper, I consider the case of rural settlements in South Asian context, where 'centralised' and 'euro-centric' development process and policies for disaster management have contributed to various internal and external dynamic pressures that are adversely affecting their traditional skills and capacity and contributing to their general vulnerability against natural hazards.

Here I will consider these issues for earthquakes, one of the natural hazards that have taken significant toll of life and property in recent years. Significantly rural areas are most severely affected. The haunting memories of the disastrous Gujarat earthquake are still fresh in the minds of all of us. Various initiatives towards earthquake preparedness, mitigation and rehabilitation undertaken by various public, semi-public and non-governmental agencies, have failed to make any significant difference on the ground.

We will consider examination of two specific situations, that of a traditional rural settlement in Kathmandu valley, Nepal and Marathwada region in India. In both the cases we will examine the conditions leading to the vulnerability conditions before the hazard event eventually leading to major disaster. While the first case will elaborate in detail on how we approach these conditions of vulnerability in the first place, the second case will elaborate on how post disaster response further affects these vulnerabilities for better or for worse.

While it is important to discuss vulnerabilities, one cannot lose sight of the inherent capacities within rural communities not only to cope with such disasters but also use them as opportunity for learning (and/or unlearning) their knowledge to mitigate the effects of future hazards, which in this case are the earthquakes. Therefore, both the cases will also look at the traditional knowledge systems that served to mitigate the impact of natural hazards such as earthquakes. The consequence of present models for development and disaster management on the capacities will also be assessed. The Latur case will further

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2 Ironically the dichotomy between the ‘developed’ and the ‘developing’ is also the result of these assumptions and shaped by the current development discourse.

3 In 1991, Uttarkashi earthquake rocked several small villages and caused significant damage to the vernacular housing in mud and rubble. The Marathwada earthquake of 1993 affected several big and small rural settlements. An estimated 65 percent of rural homesteads suffered greatly or collapsed in the wake of this earthquake. The Garhwal earthquake in 1999 has also caused widespread damage to vernacular settlements.

4 A disastrous earthquake struck Kutch region in Gujarat, a state in the western part of India, on 26th January 2001. Official records put death toll at nearly 20,000.
elaborate on the coping practices of the local community not only against the disaster in question but also against the disaster response decisions. Let us consider these two cases in detail:

**CASE I - Bungamati a traditional rural settlement in Kathmandu valley – transformation processes affecting pre-disaster vulnerability**

Bungamati is a fairly small (by South Asian standards) rural settlement in Kathmandu valley in Nepal. The village belongs to Newars, one of the major ethnic groups with rich cultural traditions. It holds high religious significance in Kathmandu valley, for the temple of Rato Machendra Nath, a celebrated God of Newars, around which the whole village has evolved. The settlement has maintained distinct physical, social and economic characteristics for generations. However, in the last few decades, the settlement is transforming fast, due to certain factors which will be discussed later. However, let us first understand some traditional characteristics of traditional Newari settlement like Bungamati.

**The traditional systems**

The traditional Newari rural settlement is primarily agrarian in nature. Agriculture has thus been the traditional occupational base of the village and a source of sustainable livelihood, while secondary jobs were to be assigned according to castes. It has so closely been associated with lives of people that they derive their cultural identity through it.

The village community has always been close knit and characterised by strong inter-relationships and mutual dependencies, many of which are reinforced through caste system. These include special skills and knowledge that is mainly derived from optimum use of locally available resource e.g. carpenter, pottery, oil-pressing etc. Such a community (or various social groups within it) has been undertaking collective initiatives and decisions on matters of common interest. Religious and cultural practices govern many of their collective actions that consciously or sub-consciously serve a common purpose for the good of the community as a whole. For example ritual paths have defined the village boundary for centuries and as such preserved the local ecology.

Significantly, the traditional relationship to land has also been very special. It was not viewed as just a resource for exploitation, rather it has symbolic, sacred and social associations / meanings for the community. As such, the whole community or various social groups within it jointly own large part of land in and around the village. This includes big religious squares (*bahals and bahils*), *Guthi* lands, *chowks* (semi-public

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5 The population of Bungamati in 1998 was approximately 6500.

6 However, here it worth mentioning that in spite of all the benefits, the caste system left certain section of people totally marginalized and got exploited by the ‘higher’ castes. However, these marginalized sections were nevertheless important for the village community and served them with essential functions.

7 The village community or various social groups within it, who form a religious trust called ‘Guthi’, collectively own a large chuck of land, known as Guthi land. Such land, which exists within the settlement and around it, is used for farming as well as for carrying out religious practices.
courtyards jointly owned by the families living around it) and lastly, private residential plots. The upkeep of such land was their collective responsibility and the benefits from it are being used for the overall welfare for the community.

Such villages are traditionally surrounded by agricultural and forested land under different ownerships. In Bungamati, as late as in 1968, around 20,000 rupanees of land was under various Guthis, people from nearby towns of Patan and Kathmandu owned most parts of the fertile land along Bagmati River and the local community from Bungamati owned most of the hilly land around the village. However, they were cultivating in most of these lands. Whatever they produced was enough to sustain the economy of the village.

Such traditional social, religious and economic systems operating within the village enabled it to be self-contained and sustainable to a large extent. In the event of a natural hazard such as earthquake, the village had at least basic resources, skills and livelihood base to ensure community survival in the time of a disaster. Also in the long run, these served to lessen the impact of the hazard through local collective coping initiatives and recovery mechanisms.

At physical level, the settlement has always been compact and well defined through boundaries that have been traditionally set. The village is organised into various neighbourhood units, which group together to form toles and are linked by a hierarchy of streets and open spaces, some of which are processional routes for various festivals and rituals. The open spaces are very much part of life of the people for carrying out daily activities, rituals. During emergency situations for example in the event of a fire or an earthquake, they serve as important escape. The vernacular architecture in wooden frames with masonry infill uses local materials and skills and is consciously designed to absorb lateral forces of earthquakes rather than resist them. Local skills and knowledge are employed for their construction, which is mainly undertaken by local craftsmen. Last but not the least, decisions are taken at the community level through traditional Panchayat system.

After having said all that, however it will not be appropriate to overlook the weaknesses of such societies and romanticise traditional rural systems. The caste-system and existing land-ownership pattern already marginalized some social groups within rural communities. Moreover, such communities lived in isolated shells, cut off from the developments happening around them, which made it extremely difficult for them to do fruitful exchange of knowledge with outside world. Nevertheless, they had tremendous capacity to recover and mitigate the impact of natural hazards on their own terms.

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8 Besides Guthi land, there are large amounts of land, which are under private use. However it has never been under equitable ownership. Traditionally there have been big landowners, who may be from outside. Who employed tenant farmers, who belonged to the village themselves?
9 One rupanee = 74 x 74 ft./ approx. 600 sq. m
10 The available resources can be wood, hay, mud (for reconstructing houses), the skills can related to rebuilding houses, infrastructure using traditional techniques. Agricultural produce will form the sustainable livelihood base during disaster. Even if it is not enough to sell the produce, it can ensure community’s own survival, which is crucial at that time.
11 Traditional neighbourhood boundaries have been defined according to open spaces, which are linked to a particular social group within community and their association with local landform, through which they physically identify themselves with that space.
The transformation processes

Let us now look at the current transformation processes in village Bungamati that are characteristic of such rural settlements in the region. We will then examine their impact on the vulnerability and capacity of such settlements against natural hazards in general and earthquakes in particular.

The processes of transformation in Bungamati over last 30 years can be assessed in terms of changes within and around the settlement in terms of land ownership and usage pattern. Interestingly, while internal densification is taking place within the village, external forced transition is happening around it. Let us understand these diametrically opposite processes in detail.

Internal changes within village

A close analysis of the current changes in the land ownership status within village reveals that social segregation (based on the caste system which determined their spatial location in the village) is breaking up and people of different castes are moving together. In fact now, the economic forces determine land transactions. As a result, the rich can afford to buy the plots / houses from economically poor, who are left more marginalised.

Also, with increase in the family size, single residential landholding is being divided among the brothers in the same family, first vertically within the house and then through addition of one floor. When this reaches a point of stagnation, the private vegetable gardens are being built over. Interestingly, the public and semi-public land within the village is still intact and put to common activities. This is leading to densification of the built form while maintaining the overall spatial extent and form which has been determined traditionally by a ritual path and landform. The result of the increasing densification is a very poor physical fabric and loss of open spaces, which now makes Bungamati highly vulnerable to earthquakes.

Forced transition around bungamati

It is found that striking changes in land ownership have occurred over last 30 years. More and more agricultural land is bought by outside people from Kathmandu and Patan who are putting it to residential and public use. This is seen particularly in areas along main access roads and in Guthi lands. While, the land along access roads is bought mainly for commercial purposes, the Guthi lands are very vulnerable to residential use by outside people. This is explained by recent government decision to take over the transaction process of these lands. Now, the people cultivating on them can buy these lands from Guthis at a very cheap price of Rs. 10,000/- per rupanee. The Guthis (the traditional religious trusts) are supposed to put this money in bank and can only draw interest from it.

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12 The comparison over 30 years is based on the studies done on the settlement in 1968 and 1998. In 1968, a team of Danish architect students and teachers did analysis of the settlement structure of that time. In 1998, students in Urban Ecological Planning from Norwegian University of Science and Technology assessed the transformations over 30 years under the supervision of Prof. Hans Christie Bjaeness. The author was part of this team.

13 Consequences of policies followed over last few decades influenced by forces of market capitalism.
to support their activities. However, the local people, who are desperately in need of money (thanks to extreme poverty, the reasons for which will be dwelled on later), sell these lands to outside people, who are willing to pay much higher price.

Another interesting reason for local people selling their land to outsiders is explained through local cultural practices. Traditionally the agricultural land is being equally divided among the brothers. This has led to gradual decrease in size of individual land-holdings. While earlier, though the land was physically divided, the entire joint family managed these lands. Now these are increasingly managed separately. On the other hand, the size of individual landholding has become so small that it is no longer fit to give enough economic returns from their produce. Also, the value of agricultural produce has decreased considerably, while the price of land has increased many folds. Local people don’t have sufficient financial resources to put this land to an alternative use. As a result, they find it much more economically beneficial to sell off the land rather than continuing to put it under agricultural produce.\(^{14}\)

In this way, fertile agricultural lands that have traditionally formed their livelihood source are being increasingly sold off and this process is being accelerated at a very high rate with each passing year. While the local people may get hard cash in return for these, they are loosing out heavily on a sustainable livelihood source, which would have sustained them in disaster situation. In many cases, they cannot even produce enough food for their own self and thus have to import food from outside. The absence of a public planning policy to check land-use changes and thereby conserve the agricultural land have only served to speed up the whole process. Only if this was not enough, Govt. in fact has plans to collectively buy a huge piece of agricultural land and establish a residential colony for outside people.

The above discussion leads to an interesting scenario, where on one hand, the people of the village are densifying themselves, more and more people from outside are controlling the land resources around the settlement, thereby putting pressure on this compact settlement, destroying its ecology and making it more and more vulnerable to disasters.

Underlying causes affecting ‘forced’ transformations

We have now briefly looked at the overall process of transformation. Lack of economic resources is the main cause affecting these forced transformations due to which the people of the village have lost the control over their future. Let us now investigate the underlying causes for this extreme poverty situation.

Over last few decades, agriculture has lost its economic potential, generated through its raw produce, thanks to the continuous thrust on industrial development at the cost of agricultural sector. Moreover, with increasing family size, it is no longer able to sustain the

\(^{14}\) The impact of all this is now being gradually felt on the unique natural setting of Bungamati. Very recently, a Boarding school from Patan has managed to purchase 70 rupanees of fertile land between Bungamati and Khokana (a neighbouring traditional village) and embarked on an ugly modern construction at a very big scale. This is now complete and the context of Bungamati has been changed forever.
whole family. Also, as mentioned earlier, the agricultural lands have got subdivided among brothers to the extent that they are no longer able to reap a profitable harvest.

Besides agriculture, the traditional occupations ascribed to various castes have gradually become obsolete\(^\text{15}\). While certain low caste occupations such as those of Butchers have found higher economic viability compared to those of traditional high caste function like that of the priest. This has a positive impact on decreasing traditional social segregation. However this comes at the cost of increasing economic segregation since some of the people no longer find any economically viable role. On the other hand, certain lower caste groups have further been marginalized economically e.g. those of sweepers. At least the traditional occupational base was designed to meet the demand and supply within the village and everyone in the community could find a role for himself / herself.

With this kind of transition, the community structure is breaking up fast. The rich are powerful and thus can access all the services, while the poor get more and more powerless. Such a bifurcated community is no longer able to take collective initiatives / decisions and implement collective actions, which are crucial both for preparing as well as responding to the disaster.

The impact of crumbling traditional occupational base is that more and more people are changing their occupations. Agriculture is gradually ceasing to be the primary occupation and more and more people are shifting to tertiary jobs required in cities. In fact, nearly 60\% of the villagers in Bungamati, who are below 30 years, are now engaged in woodcarving and metal work, to cater to the tourist industry. Ironically while these crafts were originally supposed to serve the local people in building houses and other infrastructure that served their own needs, this is no longer the case now. In fact the tourist industry is flourishing at the cost of local services and infrastructure. At present, those who are officially suppose to provide these are being unable to do so in the face of financial crunch and top-down bureaucratic structure.

Interestingly, as mentioned earlier, many of these crafts and skills have sound capacity to withstand earthquake forces\(^\text{16}\). Also since these employed use of wood and masonry, their reconstruction (in the event of an earthquake) was economically viable (as materials were locally available and many of the materials could be salvaged and reused). With loss of local knowledge and skills about traditional construction, complemented by changing lifestyles and growing perception among local people that traditional buildings are weak against earthquakes compared to ‘modern houses’, the vernacular fabric of the village is increasingly getting lost. However, even this occupational shift is doing no good to these craftsmen, since most of them do not get the right price for their skilled products, thanks to the middlemen, who in the process make money at the cost of local community.

The result of these processes has been an increase in vulnerability of such rural communities as Bungamati. Therefore, if an earthquake strikes the region now, its impact will be of untold proportions, not only in terms of loss of life and property but also in terms

\(^{15}\) The traditional occupations of Newars that have become obsolete are oil pressing, spinning and weaving and leather works

\(^{16}\) By withstanding we mean absorbing lateral forces of earthquake and not resisting these as the modern structures do.
of the capacity of the local community to recover from it. This scenario is very different from what used to be the case earlier. The historical records from earthquake in 1934 suggest that almost the entire village suffered heavy damage, however people could redevelop this village with their own skills and resources and reinforce cultural identity by recreating traditional fabric. Of course, one has to realise that this was a painfully slow process.

While the vulnerability of such settlements as Bungamati continue to increase, sustained efforts towards disaster preparedness and mitigation are being carried out by various international and local NGOs\textsuperscript{17}. However their efforts are not enough to produce visible difference on the ground situation, primarily due to the fact that local people are not convinced about the need to prepare themselves for an unpredictable event like earthquake, when their obviously predictable basic needs are not fulfilled. These are essentially linked to the underlying causes that are affecting their vulnerability, that we have already discussed. Obviously, we cannot help much by trying to solve the visible effects without looking into their deep-rooted causes.

Another main reason is the ineffectiveness of the local Village Development committee (VDC), the grass root organisation, to take actions due to lack of power and economic resources. Then there is an issue of current administrative boundaries that do not always take into account the traditional boundaries. This makes it difficult to link management decisions to existing social relationships\textsuperscript{18}. Moreover, the current top-down system of planning and management is bound to overlook the needs of the people at the village level\textsuperscript{19}. Last but not the least, enough blame can be placed on the present planning policies, which completely overlook such important aspects as that of land-management.

CASE II - Marathwada (Latur) Region – the consequences of post-disaster rehabilitation process

Pre-disaster vulnerability

\textsuperscript{17} Worth mentioning here is the name of one NGO called NSET, ‘Nepal Society for Earthquake Technology’, which is running vigorous programme of educating the villagers about the earthquake threat and preparing them to meet the disaster. Efforts towards mitigation are also being carried out through construction of model houses / schools that demonstrate earthquake- resistant technology.

\textsuperscript{18} The lowest administrative boundary is called ward. It is demarcated along the existing road structure while traditional boundaries are demarcated on the basis of open space structure.

\textsuperscript{19} District Development Committee (DDC) controls the finances. Though the actual decisions are in the hands of VDC, they cannot really implement their decisions since the finances are controlled by DDC, who release money for VDC in standard instalments, irrespective of the actual need at a particular time.
Through first case, we have looked in depth into the transformation processes that increase vulnerability of rural settlements against natural hazards such as earthquakes. These processes in fact create the setting before the hazard event, for the disaster to actually happen. We will now investigate the case of Latur, that demonstrates how decisions taken after the hazard event, change the existing vulnerabilities and capacities.

Marathwada region is dotted with numerous small villages whose traditional socio-cultural and economic structure is quite similar to the one in Kathmandu valley. These settlements are also primarily agrarian in nature. Caste system used to determine the social and economic roles and responsibilities of the community. Traditionally, these villages were also self-contained units.

However, the pre-disaster situation in Latur (before 1993) was very much similar to the present situation of Bungamati. In fact the same transformation processes increased the vulnerability of the people against earthquake, in the first place. This region became one of the most economically poor regions of India. The primary reason being that agriculture could no longer meet the basic needs of people. Increasing marginalisation of the majority of rural community was also linked to the land ownership pattern. Though zamindari system\(^{20}\) was abolished after independence, the big landowners continued to exploit the majority of poor small tenant farmers, who were increasingly getting weak and powerless socially, economically and politically.

One of the main consequences of the increased marginalisation was that many people changed their traditional professions. These included local craftsmen who were no longer able to support themselves through traditional barter system. As a result, most of their knowledge was slowly forgotten (got lost) or got degenerated. Take the case of Sutars (carpenters, who make unique roof pattern called ‘Malwad’ as well as agricultural tools), Wadars (who were involved in extracting and breaking the stones from quarries and used to play a vital role in stone masonry work) and Patharwats (who used to decorate house entrance and does stone carving). While Sutars continued to make agricultural tools but the practice of ‘Malwad’ was mostly lost. This is because of scarcity of wood due to increased deforestation and its high market value. Also, the local people no longer felt the skills of wadars and patharwats needful. As a result, stone masonry gradually deteriorated in terms of the quality of stones used and their shape and size needed for proper bonding.

Moreover, due to poverty, people were no longer able to maintain their existing houses. As an example, linseed oil used to be applied to wooden beams and columns so as to prevent them from rotting. However with poverty, people were no longer able to afford it and the practice was discontinued making wooden structures weaker. Besides deterioration, certain alterations in the fabric out of sheer ignorance also added to the physical vulnerability e.g. the thickness of roof increased as additional layers of mud were added on the top. Thus, behind seemingly nice facades of vernacular houses, the fabric had deteriorated / altered to significant extent. The result of all these factors was that the physical fabric became weak and more and more vulnerable to earthquakes.

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\(^{20}\) Zamindars were big landowners who employed lot of petty tenant farmers to work on their lands for meagre sum of money and exploited them. This system was abolished after independence. However informally, the practice still continues.
When in the early morning hours of September 30, 1993, an earthquake of Magnitude 6.3 on Richter scale shook the region, it left nearly 9,000 villagers dead and around 16,000 injured. In 52 villages that were most severely affected some 30,000 houses were destroyed or badly damaged. The vulnerable vernacular fabric suffered enormous damage and caused big loss of life. On the basis of quick damage assessment immediately after the earthquake, the traditional techniques of vernacular housing were deemed to be the major cause of life. All local construction practices were rejected by the ‘official expert agencies.’ Local people who saw there loved ones die under the heap of stone rubble also developed an acute fear for these constructions. The traditional techniques were considered to be ‘unsafe’ for future habitation. In this way, the physical vulnerability was simply ascribed to ‘faulty’ traditional construction practices, without probing deeper into the actual socio-cultural and economic reasons for the same.

The Rehabilitation Process

The initial phase of emergency rescue and relief lasted till December 1993. In the next phase, the government evolved a rather comprehensive rehabilitation programme called Maharashtra Earthquake Emergency Rehabilitation Programme (MEERP). This was the first of its kind in India and was conceived and executed with the help of a soft loan from the World Bank. The programme had five main components namely housing, infrastructure development, economic rehabilitation, social rehabilitation, community rehabilitation and technical assistance, training and equipment.

Under the housing component, the construction / reconstruction of permanent housing would be financed. The villages were divided into three categories based on pre-defined criteria21 namely:

i. Villages to be relocated- type ‘A’ villages
ii. Villages to be reconstructed – type ‘B’ villages
iii. Villages where repair and seismic retrofitting of existing houses would be carried out – type ‘C’ villages.

The houses were again divided into three categories, on the basis of land holding with the head of a particular family22.

The infrastructure component covered reconstruction, repair and strengthening of public buildings and infrastructure and the improvement of transit shelters. The activities covered

21 These categories were based on certain pre-defined criteria. The villages to be relocated were those where more than 70% houses were damaged, where a certain number of deaths were reported and where a certain number of deaths were reported and where the ground had black cotton soil up to a depth of 2 metres. Where the damage was more than 70% but strata was good i.e. soil is less than 2 metres depth, it was decided to reconstruct those villages in-situ. The ‘C’ category villages were decided on the basis of a detailed ‘technical’ survey by a team of government engineers.

22 Accordingly ‘A’ category houses had a carpet area of 250 sq. ft. These were to be provided to farmers who were landless or had land up to 1 hectare. ‘B’ category housing of 400 sq. ft. carpet area was provided to those having land-holding between 1 hectare and 7 hectares and all bigger landlords having more than 7 hectares of land-holding got ‘C’ category houses of 750 sq. ft. The built up area for these houses was about 10% more than the carpet area to allow for future expansion. In the ‘C’ category villages, Government was supposed to provide technical assistance towards strengthening and retrofitting, through junior engineers.
under the ‘social rehabilitation’ component included provision for special facilities and activities to address the needs of women and children affected by the earthquake, and improvement/restoration of social facilities such as age old homes, child care centres, district trauma centres, homes for handicapped, community centres for women etc. Towards economic rehabilitation, the programme had made provision for repairs/reconstruction of dug wells, replacement of bullocks, replacement of major and minor farm implements, replacement of cattle and rehabilitation of artisans and small businesspersons. The component of community rehabilitation covered the cost of works and materials required to re-establish essential services such as medical services, construction and provision of services for temporary transit shelters.

However, among all other components, the housing component was given the first priority. 52 villages were to be relocated with essential services and infrastructure. New standards were set for housing construction that advocated the use of ‘earthquake resistant technology’ The government managed to get the participation of a large number of non-governmental agencies including commercial firms, international donor agencies, religious groups, political parties etc. in the programme. These agencies came up with variety of building technologies to demonstrate seismic resistance. Under the training component, several training programmes of masons and rural labour in the new ‘earthquake resistant construction’ were undertaken in order to make sufficient work force available to undertake massive construction activity.

The aims and objectives of MEERP were well formulated and well intentioned. However, their implications in practice raise certain issues regarding the socio-cultural and political factors and the perceptions of decision makers behind certain decisions like relocation, housing, community participation etc. We will try to look into the long-term consequences of these decisions and assess if they have been able to reduce vulnerability of the communities in the long run.

The implications of the decisions

Firstly, let us question the basic presumptions (criteria) for certain decisions. Relocation was encouraged at the cost of insitu reconstruction and seismic strengthening. In fact 15 villages, which were supposed to be reconstructed in site, got relocated. This was due to mis-perceptions in the local communities that their sites were unsafe from earthquakes. These were strengthened by official propaganda in favour of relocation.

However relocation has resulted in number of problems. As mentioned earlier, traditionally the agricultural land surrounds villages, and the whole rural ecology is sustained on this delicate social, cultural and economic relationship of people to their natural resources. However, relocation was done on agricultural land acquired from other villages. As a result, some of the relocated villages either lost their land to relocation for other villages (thus becoming landless forever, even though some financial compensation was offered to

23 These included pre-cast concrete panels, geodesic domes with Ferro cement, insitu reinforced concrete, hollow concrete blocks etc. It is worth noting that almost all the agencies advocated the use of concrete.

24 Around 900 masons and 2800 labour were trained in 20 centres in Latur district with the help of voluntary training officer through paying petty daily allowance. However this was only an initial activity limited for one year.
them) or were themselves relocated far off from their agricultural lands, sometimes more than 5 kilometres. Most importantly, though relocation has helped to serve the immediate need for shelter, it has also served to increase economic vulnerability by making it harder for them to pursue their sustainable source of livelihood.

The criteria for housing allocation on the basis of land-holdings has created new ‘economic disparities’ and completely destroyed the traditional social system based on ‘neighbourhood units’ and ‘mutual dependencies that ensured sustainability. As such, big landowners got larger plots compared to petty tenant farmers. Moreover, craftsmen (who did not own agricultural land) and other landless people were marginalized further as they got smallest or no house plots at all. In this way, the existing social segregation and marginalisation of certain groups was reinforced making them more vulnerable to disasters.

It has further enforced divisions between the communities as people from the same neighbourhood got different house types, which were spatially located according to their size. This destroyed traditional neighbourhood pattern, which were based on social and cultural relations rather than economic status. This has adversely affected the existing collective coping mechanisms of such communities and made them socially vulnerable to disasters.

The spatial design of these relocated villages is ‘city-like’ with wide streets forming grid pattern and row housing. The ‘designers’ from the town planning office perceived that such planning would ensure earthquake safety and ‘development’ of ‘backward’ rural areas. However, such measures aimed at reducing physical vulnerability in fact have served to enhance cultural vulnerability since these are totally incompatible with local ‘way of life’. Traditionally, settlements are characterised by a hierarchy of public and private open spaces used for religious / cultural practices as well as other daily activities, clusters of housing with distinct typologies based on the occupational pattern. But in the new set up there are no physically identifiable spaces for such activities. Importantly no work place has been conceived for the local service sector like craftsmen. Most importantly, the new physical fabric does not reinforce cultural identity that is so much crucial for the psychological recovery of the people from disaster.

Interestingly, the relocated villages are many-fold larger in area than the old ones (up to 10 times larger). This meant expensive infrastructure, which was again ‘provided’ by the government. What was not thought of is the lack of financial resources with local village committee to maintain this huge infrastructure in the future.

The design and construction of these ‘earthquake resistant houses’ is also found to be unsustainable both in terms of spatial quality, use of building materials and building technology (building techniques). The house designs are also very urban with no link to traditional life-style. An interesting example of this is the provision of attached toilets in houses. Traditionally, these people are not even used to having toilets in their houses, they

25 This has been a source of great difficulty now since the local village committee had to increase taxes to cover the costs for maintenance of this infrastructure and the poor villagers are unable to afford it. E.g. in one village (Jewli), the poorest that had to earlier pay Rs. 135 (less than 3 dollars) per year are now made to pay Rs. 1200 (nearly 27 dollars). However due to their inability, only 10 to 13 % of estimated revenue is being collected.

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would use the fields instead. Now we find that these toilets are used for storing grains. Regarding material and construction techniques, most of these houses employ use of concrete with heavy reinforcement. Interestingly, however there is not enough sand and aggregate available locally and cement is unaffordable by poor villagers. Moreover, the region lacks sufficient water that is crucial for proper curing. As a result, in many cases, the quality of the new constructions is very poor and cracks and dampness is visible within 5 years of their construction. The most serious is the development of ‘thorough cracks’ in some houses due to a recent earthquake of mild intensity of Richter Magnitude 4 in June last year (2000)\(^\text{26}\). Had these been traditional houses, people would have had the possibility of finding a courtyard to escape into, but the modern designs generally have single entry and exit. This is very ironic as those houses, which were intended to be earthquake-safe have turned out to be physically more vulnerable than what had existed before.

The local knowledge and techniques were totally rejected in the whole rehabilitation process\(^\text{27}\). The engineers trained in ‘western’ education perceived traditional technology to be ‘outdated’ and ‘weak’ and more vulnerable to earthquakes, without looking at the transformations that had in fact made these more vulnerable over time. e.g. lack of maintenance, insensitive additions, and loss of knowledge. Even in the ‘C’ category villages where strengthening and retrofitting of existing houses were to take place, the junior engineers allocated by the government to provide technical assistance, strongly advocated local people to vacate them and build ‘modern’ housing in brick and concrete. Poor villagers who had suffered great trauma were too scared to risk their lives any way and thus submitted to the ‘expert’ views. As a result most of these villages were slowly vacated and people demolished their own houses and sold well-dressed stone blocks and wooden beams and columns at petty prices. They started settling down just outside the old village and used the money allocated by the government to construct new houses. With the little money that they got, they could hardly afford to construct one or two rooms in poor quality bricks in mud mortar and corrugated tin sheets for roofing. Besides being of poor quality, they are totally unsuitable for local climate, as the tin sheets get oven hot during hot summer days.

While on one hand the traditional technology was discouraged, the local craftsmen (who are the carriers of this knowledge) were not encouraged to participate in the whole process. The rehabilitation process could have provided them with an excellent opportunity to improve on their existing skills and also a source of livelihood, which is so crucial for recovery after the disaster. It would also have ensured internalising earthquake safe practices in the local community. Even the building centres which were supposed to promote construction activity and generate employment through training programmes for construction artisans, labour and unemployed, failed to effectively involve local artisans, who were any how made to neglect their existing skills and made to learn something totally alien and heavily dependent on external resources\(^\text{28}\). Moreover, earthquake resistant

\(^{26}\) In one village, Rebe Chincholi, people have vacated some of these houses out of fear

\(^{27}\) Traditional wood framed ‘Malwad’ construction behaves much better in earthquakes. Also traditional ashlar stone masonry with through stones behaved much better in the event of earthquakes.

\(^{28}\) Ten building centres were set up in the region supported by HUDCO (Housing and Urban Development Corporation) and also assisted with Government of India. At present, all these centres have been shut down for last three to four years.
technology was taught to them as rigid design packages, with out any scope for experimentation with the local craftsmen.

The result is that in spite of pooling in so many resources, the rehabilitation process has failed on many fronts. To top it all, it has even been unable to provide safe constructions, in spite of heavy emphasis on importing ‘earthquake-resistant technology’. Secondly, it has failed to inculcate awareness, information and knowledge on preparedness and mitigation against future earthquakes. Thirdly, it has served to destroy cultural identity that is crucial for psychological recovery of the community. And last but most importantly or rather ironically reinforced and in many cases, increased the social, cultural and economic vulnerability of already marginalized sections of the local community. In some cases, even new vulnerabilities have been created.

While social, economic and community rehabilitation were essential components of the rehabilitation programme, these relied heavily on provision of physical infrastructure, without looking deeper into the ways and means of facilitating locally sustainable processes for recovery and development. Rather rehabilitation process was conceived to exist outside the normal development process or at maximum contributing towards it but not as part of it. Only through the latter, lessening of root causes for vulnerabilities towards future earthquakes could have taken place.

Also community participation was explicitly identified as the means to do rehabilitation. However, there is considerable difference in what is conceived in theory to what happens in practice. The existing power relations did not allow for equal representation from various sections of the community, including the marginalized ones.

In spite of all the problems created by the rehabilitation process, the extraordinary coping capacity of the local communities cannot be under-estimated. There are interesting ways in which people on their own have not only devised effective solutions to cope with the disaster itself but have also adapted themselves and also creatively change the surroundings to suit their ‘way of life’ and thus cope with the consequences of rehabilitation itself.

One of the striking observations is the physical changes and additions initiated by the villagers to the physical fabric that was tailor-made for them. We notice different changes in house structure e.g. addition of rooms, outdoor kitchen, courtyards, access points. However, the most noteworthy is the change in materials. Hardly any of the villagers have used reinforced concrete (except for those who are well off). Some have used bricks but most have used corrugated tin sheets, even bamboos / twigs. In many of these houses, people have used salvaged materials from their old houses. These include their beautiful front doorways, dressed stone masonry and in some places, wooden beams and columns (though in most cases, these are being sold or used as firewood).

Interestingly however, after initial hesitation people are reverting back to traditional techniques, especially stone masonry for boundary walls and at some places for walls up to sill level. Most recently, another trend is being seen. Not only are people changing over to
traditional building techniques, they are also moving back to their old village sites\textsuperscript{29}. Unfortunately, they are not employing ‘earthquake safe features’ in their new ‘traditional’ constructions. This is a real evidence of failure of the rehabilitation process to raise awareness and information on earthquake preparedness and mitigation and internalise the knowledge with the local communities.

Latur case is an interesting example that shows the current thinking behind managing disasters in a reactive manner. It is not the only rehabilitation process that has failed on many fronts. One can look around and find plenty of such examples, especially in developing countries. The rehabilitation process that has been initiated in the aftermath of the more recent Gujarat earthquake, one wonders why we fail to learn from our mistakes\textsuperscript{30}.

**The emerging issues and directions:**

Let us generalise on certain basic issues and directions that emerge from the discussion of the above two cases. In spite of enough being said in theoretical circles, we are still very reactive in our approach towards managing disasters. We try to respond to visible affects of disasters without undertaking a deep probe into the underlying causes that create conditions for disaster in the first place\textsuperscript{31}. While we stress the importance of addressing the underlying causes, we should be careful to note that the cause and effect relationships are not linear and deductive and cannot be reduced to simple explanatory models. Rather these are governed by complex inter-relationships that are deeply embedded in the local context determined by existing paradigmatic base for development (which determines the existing policies for disaster management), existing institutional capacities and last but in my opinion most importantly upon existing cultural beliefs and practices. In fact the latter shapes the former aspects in many ways. The underlying causes are not ‘root’ causes in that sense, since there is no single starting point (root) for disaster.

These cultural practices also determine how human beings in a particular geographical context relate to their environment and the resources available at their disposal. Such territorial relationships are not only governed by the physical needs but also ‘sub-consciously’ governed through deeply embedded world-views. Take the case of relationship to land in the above two cases. The way land resources have traditionally been used as collective and symbolic entities (e.g. through ritual paths, guthi lands) have preserved the rural ecology for generations and helped in mitigating the effects of natural hazards. On the other hand, when the same cultural processes interact with new market forces of capitalism and neo-liberalisation, the land resources get exploited as mere commodities for sale.

\textsuperscript{29} The author in one village Sayyed Hipparga saw this. At the time of the visit by the author (September, 2000) people had started to clear the old site of vegetation and re-construct their old houses employing traditional techniques in its entirety.

\textsuperscript{30} The author joined the international team of experts for an interdisciplinary reconnaissance of the January 26, 2001, Bhuj, Gujarat earthquake. The reconnaissance was sponsored in part by World Seismic Safety Initiative (WSSI).

\textsuperscript{31} The visible effects shape themselves in the form of socio-cultural, economic, physical and other forms of vulnerabilities in relation to one or many hazard events. However various vulnerabilities shape each other in one-way or another.
This has happened more out of force than out of choice, thanks to the consequences of ‘modern and progressive’, ‘centralised’ and ‘euro-centric’ notions of current development process. In fact, such a development, that was supposed to lessen the vulnerabilities, created the vulnerabilities of certain sections, while helping handful of groups with power and control over resources. While the traditional mutual dependencies within the communities were destroyed, outside dependencies got created leading to loss of sustainability, thereby increasing vulnerability against disasters. In the context of south Asia, the much criticised caste-system that led to social segregation got replaced by much worse economic segregation, where certain sections got marginalized and continue to get more and more marginalized. However, at this point, it needs to be stressed again that though we learn to appreciate traditional societies, we also need to be equally cautious of their inherent weaknesses in terms of social marginalisation and gender discrimination.

Another related issue is the essential urban-bias that is very much visible in the postcolonial policies which over-emphasised industrial development has led to the growing marginalisation of rural communities. Here one gets reminded of the futuristic vision of Mahatma Gandhi, whose people-centred rural development approach at grass root level would have greatly helped these communities to develop on their own terms. This would also have ensured restoration of civic pride, which is crucial for local communities to rediscover their own knowledge base and evolve with the changing context. This along with a well-formulated education system would also help these communities to be more conscious of their assets and also engage in fruitful dialogue with external information and not merely as passive recipients in the event of disasters, as is generally the case now. Such a conceptual shift will also ensure that not only existing vulnerabilities are reduced but also at the same time the existing capacities are strengthened. It is only when the above conditions are fulfilled, vulnerability and capacity assessment can become a tool for the empowerment of these communities rather than a purely analytical tool for ‘experts’ (Wisner, 2001)

This will also serve to bring the 'traditional' knowledge and the 'expert' knowledge to interact with each other, more in terms of the needs and priorities of local community. Disaster planning and management cannot be explicitly tailored for rural communities in a sectarian manner, rather these will need to be internalised in a holistic manner into their frames of reference and not those of experts from outside. On close monitoring we discover that some aspects of disaster preparedness and management are already embodied consciously or sub-consciously into various cultural practices that are carried for generations. Take the case of the use of wooden ‘malwad’ constructions in vernacular structures, both in the case of Kathmandu and Latur. Unfortunately, both the cases aptly demonstrate that the main victims of the present development process are farmers and craftsmen, who in fact are the bearers of cultural heritage. Therefore, the goals of disaster management can be truly realised if they are empowered.

The case of Latur also brings out clearly the inherent conflict of interests, priorities and perceptions of various stakeholders in disaster mitigation and recovery process. One questions who are the real decision makers in the whole process. Whether they are the experts from outside or the local people. What role does planners and other decision
makers have in the rehabilitation process, as providers of expert solutions or as facilitators in the community recovery process on their own terms? It also reminds us of the need to undertake equitable community participation by involving marginalized and the powerless in the rehabilitation process. However at this point, one must confess that this is all easier said than done give the existing social and political context.

Finally, one needs to ask oneself, what does development and disaster management mean for the local community. It cannot just imitate the macro-economic growth models, as there is no real benchmarks to measure ‘development’ per say. Economic models of sectarian development have to be replaced by ‘Holistic perspective towards Eco-development’ that stresses on cultural evolution (and not just continuity) and territorial relationships (Sachs, 1974, Hettne, 1996). Importantly, culture is not static entity, it is a dynamic ever-evolving phenomena. No culture can survive if it refuses to adapt to new knowledge and situations. Disaster management has to be built into such development processes driven by local initiatives. They ‘the local people’ (and not we ‘the experts’) need to manage such development. Disasters will be managed once development is managed.

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32 The underlying political motive behind rehabilitation process is to produce short-term solutions to show the ‘visible results’. The best way to do this is to show the number of houses reconstructed.

33 Eco-development is a style of development that in each eco-region calls for specific solutions to the particular problems of the region in the light of cultural as well as ecological data and long term as well as immediate needs. Accordingly, it operates with criteria of progress that are related to each particular case, and adaptation to the environment plays an important role (Sachs, 1974; 9)
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