

## **Integrated Urban Development with Real Time Urban Hazard Information Systems - An Approach to Building Climate Resilient Intelligent Cities**

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It is now more than a decade since this lead UN agency in the context of a rapidly urbanizing world declared the Habitat Agenda at Habitat II Conference in Istanbul, Turkey 1996, which is "To promote and encourage all parts of society to participate in disaster preparedness planning and in disaster prevention through activities that build a culture of prevention." The Habitat Agenda clearly outlines the link between human settlements development and vulnerability to disasters and the global plan of action towards prevention through Disaster Management Programme. UN-HABITAT mandated national and local governments, as well as civil society through the Habitat Agenda to take the lead in disaster, mitigation efforts in human settlements. UN-HABITAT promotes concepts of inclusion, participation, collective action and sustainability in the context of human settlements. In India, with the Right to Education bill getting parliamentary approval in 2009, Right to safe and secure human living environment away from natural hazards may not be far behind.

Although these hazards exist in both developed and developing countries, they often impact more severely in developing countries where the institutional capacity is lowest, leaving large populations of the under privileged inhabitants chronically vulnerable. The agenda spells as to how to bridge the gaps that repeatedly emerge between sustainable development efforts and emergency disaster relief and to provide local government, civil society, local social structures and business organizations with practical strategies and tools for mitigating and providing people centered solutions in disaster management. The Habitat Agenda recognizes the particularly deleterious impact of disasters on women and children.

It is in this context that the paper focuses on development of strategic tools for Indian subcontinent in planning and designing and development of cities that are disaster proof against all vulnerable environmental hazards which is the need of the hour. The paper addresses need for special native tools for intelligent urban planning and administrative decision support systems that is based on the conventional planning techniques, real time Urban information systems and peoples participation The paper presents with an methodology that needs to be adopted for development of intelligent settlements that can handle all the extremities posed by nature and contribute to the disaster mitigation process in cities.

## **Disaster Risk Reduction through Participatory Action Planning Process- Shimla City, India**

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Disaster vulnerability to is one of the most underestimated issues in urban development in India, The Indian urban population has grown more than 3,5 times from 62.4 million to 285.35 million and the number of urban centres swelled from 2843 in 1951 to 5161 in 2001. By the year 2025, 50% of India's population is expected to be living in urban areas. The wide spread building damage during recent earthquakes (Gujarat 2000 Kashmir 2005) has shown that most of the building stock is very deficient and do not follow safety rules and regulations. This has created an alarming situation, where large number of earthquake unsafe building stock is added each year to the already huge number of existing unsafe buildings. Disasters can cause major setbacks to economic and social development, inflict massive casualties, and cause the diversion of funds from development to emergency relief and recovery.

Shimla is the capital city of Himanchal Pradesh in the north Indian Himalayas, sits in an area of high seismicity that was rocked by a devastating earthquake a hundred years ago in 1905. Initiating risk reduction in this fast growing urban economic hub is an enormous challenge. The project starts in the city just before the earthquake centenary, with an aim to identify ways of reducing earthquake risk through actions that could be carried out locally by the citizens and the government.

The experience of community action planning approach was unique in term of a mix of technical tools, community processes and governance. It is evident that community-government-NGO partnerships are the key to solving such acute problems as earthquake safety in a resource strapped vulnerable city. The assessment and planning phases of the process itself initiate the building of these partnerships.

The focus my paper on risk assessment and to make appropriate preparedness and mitigation strategy so that loss can be minimized and identify various ways of integrating disaster management issues in development planning in the urban context. This paper will be an attempt to share the experience of developing and testing the community based urban risk reduction framework for a city at maximum earthquake risk.

## **Why Institution Matters For Reducing Vulnerability of Urban Poor**

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Understanding institutional strength at local level is crucial for reducing vulnerability of the urban poor to climate related hazards in low- and middle- income countries. This paper highlights how formal institutional settings at local level shape vulnerability of the urban poor in Chitagong city, Bangladesh. Based on a qualitative approach, the study employs semi-structured individual interviews with local government officials and focus group discussion at community level to examine current urban development policy and institutional arrangement for reducing vulnerability of the poor to landslide hazard in the city. The study reveals that mostly poor communities live in unplanned informal settlements along landslide-prone unstable hill slopes, which typically lack of any standard building code, retaining wall along risky hill slopes, improved drainage system, and institutional response for early awareness to landslide hazard at community level. A Detailed Area Plan (DAP) of the city and local hazard management policy have already identified these settlements as risky to landslides and recommended for relocation of vulnerable populations in safer sites. However, weak coordination between local government agencies and national government and land tenure conflict to some extent, obstructs any institutional response for relocation of the poor communities and establishment of retaining walls along unstable hill slopes. Despite a disaster management committee is active at city corporation level according to national disaster management plan, those vulnerable communities are still not involved in local hazard management. The study suggests that current urban development agencies should emphasize on relocation of the vulnerable communities on an urgent basis, as well as, ensure institutional arrangements that may address the socio-economic components of the marginalized population. Moreover, land tenure conflict must be resolved in a transparent way, otherwise it may overshadow the real necessity of the target poorer communities and exacerbate their vulnerability in the long-run.

## **Climatic Resiliency for Indian cities**

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Resiliency means springing back into normalcy after being stretched. Climatic resiliency of Indian cities are gradually becoming distant-goal to reach. Reason being the some of the *climatic controls* have been heavily doctored by urbanization. Climatic controls influence behaviour of the climatic elements like temperature, humidity, wind, rain, snow and radiation. Phenomena like Urban Heat Island (UHI), urban flood, etc. are quite regular phenomena now-a-days occurring in urban environment.

Climate controls are many and their control on climatic elements is also of different types. The primary climatic controls are: latitude and altitude of any city, land and water body distribution, differential behaviour of the earth-surface with respect to insolation (incoming solar radiation), ocean current, prevailing winds, cloudiness, slope and valley, etc. To elaborate the issue an example of UHI in Central Business Districts (CBDs) can be cited; temperatures in CBDs are always 5 to 6 deg C higher and the situation is getting aggravated due to increase in hard-covered surfaces. Hard-covered surfaces have different albedo, specific heat, thermal conductivity, transparency, rate of evaporation in comparison to natural earth surfaces and thus causing differential outgoing terrestrial re-radiation. This adds up heat in presence of increased number of pollutants.

Indian cities are located in various climatic zones; namely hot-arid, warm-humid, cold-humid, cold-dry and composite. To recreate urban resiliency, we have to set a benchmark standard which supposedly be individual for every city and should indicate the condition which was existing at the earlier stage of urbanization.

The present paper will delineate the climatic control issues and their impact on climatic elements individually and as a whole. Distortions in the present-day climate will be referred with examples. And it will also suggest some solutions, both medium- and long-term to improve cities' climatic resiliency.

## **Building, Climate and Resilient Cities**

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Climate in cities are warmer when compared to that of the rural areas. This phenomenon of increased temperatures in cities is referred to as "Urban Heat Island". Urban warming is due to the replacement of natural surfaces with highly reflective surfaces such as the buildings, asphalt roads, parking lots etc and the reduction of vegetation cover. The higher temperatures in urban areas lead to decreased outdoor thermal comfort. Many studies have proved that the efficiency in both mental and physical tasks diminishes at higher temperatures. When the outdoor temperatures are not comfortable, people tend to stay indoors diminishing social activities such as taking a walk, nice ling people in public spaces, children's play etc. Increased urban temperatures will also lead to increased use of air conditioning, subsequently resulting in higher energy costs for urban dwellers. The major reason for uncomfortable urban areas is that urban microclimate and outdoor thermal comfort are generally attributed little importance in urban planning and design processes. Therefore, the main aim of this paper is to analyze various design parameters with respect to urban air temperatures and arrive at optimal design solutions in improving the urban microclimate and thermal comfort at the street level. This study analyses the urban air temperatures at eleven locations in Chennai city with urban design parameters such as the plot coverage, vegetation cover and the street geometry. Air temperatures were collected for three weeks using HOBO data loggers and their relationship with the urban design parameters were studied. It was found that the locations with dense built up spaces and lesser vegetation experienced higher temperatures. This study enables urban planners and designers in monitoring and evaluating the outdoor thermal comfort level by planning green lands, altering the surface cover and formulating urban design guidelines.

## **Transportation Issues in Disaster Management**

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Availability of modern transit system reflects the image of the society but occurrence of natural disasters states significant, preventable planning and management failures. The transportation network and evacuation planning are an integral component of disaster management. Better existing networks in terms of road, rail, water, air and life line structures such as bridges, telecom network, pipelines, etc promote better rescue, relief, recovery process, relocation, rehabilitation and reconstruction.

Different types of disaster present different types of transportation issues and vice versa. Disaster response is a part of transport planning at local, regional, national and transit level. It is emphasized to consider wide range of possible disasters and stresses on transport systems. Hence emergency transportation and public transit services are an important component of all emergency preparedness. It is equally important to design transport facilities to withstand extreme conditions of earthquake, storm, flood, Tsunami, etc.

Roles of transport in evacuations before, during or after an event, and adequate accommodation of evacuees at refuge destinations are crucial. Transport play an important role in delivery of emergency supplies and services including water, food, medical care, utility maintenance, law, enforcement; search and rescue operations, etc.

It is important to develop a multi modal transport system that provides a variety of mobility options and networks for multiple links including metro, LRT, rails, roads, paths, bridges, underpass, etc. to each destination. Additionally, advanced information and communications systems are required for proper dissemination of warning, evacuation, emergency services, etc among residents, travelers and transport authorities. There is always need to develop contingency plans to allocate fuel, emergency repair, mechanical operations, priority to public transport, high occupancy vehicles, repair of transport infrastructure, etc in emergencies. Disaster management should have plan to allow quick deployment of buses, vans, trains, etc for emergencies services which require an inventory of vehicles, their drivers, routes & direction of movements. However, transport professionals can play an important role in creating a more equitable and efficient transit system in various stages of disaster management.

## **Preparedness Approach for Disaster Risk Mitigation**

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The Indian sub continent is prone to natural disasters such as earthquake, flood, Tsunami, etc. Frequent disasters lead to erosion of development gains. Hence, preparedness approach for disaster risk mitigation is required. A "*Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters*" commonly known as the Hyogo Framework for Action (HFA) emphasized on disaster preparedness for effective response at all levels.

The Disaster Management Act, 2005 has provision for legislative framework for disaster management through establishment of Disaster Management Authority at national, state, and district levels. In this context, there is need to have disaster preparedness plan with all Urban Local Bodies to cope with emergencies situations. The 74<sup>th</sup> Constitution Amendment Act (CAA) 1992 mandates urban local bodies to function as democratic institutions at local level but public finance and resources are limited. There is lack of total coordination, absence of scientific/coordinated database, poor dissemination and advocacy. Hence, there is greater need to take up these kinds of projects in public private partnership mode.

In December 2005, the Urban Infrastructure Development Scheme for Small and Medium Towns (UIDSSMT) was launched under the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) by the MoUD, Govt. of India for development of infrastructural facilities in all cities/towns (5098) as per 2001 census other than 63 Mission Cities. The guidelines are being revised to incorporate provision of Earthquake Mitigation and Disaster Management in the preparation of City Development Plan as well as Detailed Project Reports to ensure overall safety.

Disaster management which is an integral component of Master Plan/Regional Plan documents also plays a role in capacity building of Urban Local Bodies (ULBs), etc in terms of preparedness against disaster risks. This paper intends to develop preparedness approach for disaster risk mitigation at every level in all regions of the country.

## **Predicting Urban Heat Island (UHI) Risk and Micro-Climate Change In Delhi Metropolitan Region Using Geoinformatics**

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Urban heat islands (UHI) are emerging as severe urban risk and disaster potential particularly in mega-cities. UHIs and micro-climate changes are closely linked. Land use is the dominant factor for intensifying Urban heat island (UHI) effect together with industrial concentration, transport nodes and thermal power plants. The objective of the present paper is to relate land use change and urban heat island effect in Delhi metropolitan region using geoinformatics. IRS-1C LISS-III and LANDSAT-MSS data has been used for land use analysis. Dense built-up has been increasing with maximum pace followed by open built-up. Dense built-up has increased from 1.31 per cent in 1977 to 28 per cent in 2006. Since 1981, Urban population has increased more than 2 times and Urban area which was 40% in 1981 has increased up to 62%. Need of housing have increased due to tremendous population growth rate resulting into conversion of land into built-up area. Land use changes accelerate along transport corridors-NH 1.2.10.24 and so on. Built-up area is encroaching fertile agricultural land -'especially in Northwest and South east region. There are several locations of UHI and these are shifting outwards. UHI develops along transport network in dense populated areas. Better roads and insufficient transport means increase the problem two ways-first high income group shift outside the city in search of better living and responsible for land use change. Secondly, middle income group professionals come with their own vehicles and contribute in increasing air pollution. Several UHIs pockets have been identified. The paper also suggests land use planning and promotion of Green buildings and Green neighborhood concept for mitigating the UHI effects and related disasters.

## **Amendments in Town & Country Planning Legislations for safety in Natural Hazard Zones of India**

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The Ministry of Home Affairs, Gol, Constituted an Expert Committee to prepare model amendments required in Town & Country Planning Legislations of various States and also to suggest regulations for land use zoning and provisions in development control and bye-laws, pertaining to safety in Natural Hazard Prone Areas through out the country.

Building Materials & Technology Promotion Council (BMTPC) under the Ministry of Housing & Urban Poverty Alleviation, Gol was assigned the task to organize one day workshop in different States to get the requisite amendments in the Town & Country Planning Legislations and DCR and building bye-laws. Such workshops in 19 States/UTs have already been organized and the efforts have been made to get the amendments done to ensure safety in development and construction.

This paper is the excerpts from the recommendations of the Experts Committee with the objective to disseminate the information to a very large number of professional Town Planners working in various States in different capacity, so that the Town Planner would take a step to get the amendments in Town & Country Planning Legislations and DCR/Bye-laws, as well as to take care of vulnerable areas while preparing settlement plans for safer India. The Consultant was assigned the task to help in effecting the requisite amendments.

Most of the Town and Country Planning Legislations of the States/UTs under which Regional/Sub-Regional Plan and Settlement Plans are being prepared do not define the natural hazards ,nor there is any provision to identify vulnerable areas relating to floods and land slides etc. with the result that land uses are proposed in such vulnerable areas resulting into disasters. Therefore, Techno-Legal Regime needs to be put in place to be followed while preparing existing land use maps, proposed settlement development plans with land use zoning so that our Settlements including Rural and Urban are safe against natural hazards.

## **Good Urban Governance for Building Resilient Cities**

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Since the early 1990s, India has gradually opened up its markets through economic reforms by reducing government controls on foreign trade and investment. With the liberalization in full swing and its impact on all sections of economy we are witness to the inexorable urbanization of the country. This rapid pace of urbanization has almost doubled the percentage of India's population living in cities and urban areas to 27,8% in 2001 from 14% at the time of Independence. Most of these urban areas in India are prone to moderate to high earthquake risk, water-logging from monsoon waters, floods, fire-hazard, etc. Coastal cities prone to cyclones and tsunamis. The Government of India (GoI), in recognition of the importance of Disaster Management (DM) as a national priority, had set up a High Powered Committee in 1990 and an all party National Committee on Disaster Management (DM) in 2001 for making recommendations on the preparation of DM plans and suggesting effective mitigation mechanisms.

The ever-increasing density of population in most urban areas in India magnifies the risk of any disaster-prone urban area. Lack of serious disaster preparedness in Indian cities shows complacency towards urban disasters, even after Ahmadabad (2001 Earthquake), Chennai (2004 Tsunami) and more recently Mumbai (2005. Floods). Awareness generation, no matter how expensive, is the only option to create a mindset that accepts risk, and learns to deal with it in order to minimize losses to lives, livelihoods and property in urban areas. Also cities need to create a workable system to handle disasters, including mock-drills for preparedness that involve not only government and paramilitary forces (as commonly thought of) but the communities themselves, who are often the only first responders at zero hour.

## **Development of Risk and Vulnerability analysis model in a Regional Context**

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Disaster Risk Reduction is a method or tool to reduce the impacts of natural and human-made hazards. Such as tsunamis, earth-quakes, cyclones, landslides, and climate change related events such as droughts, storms and sea level rise. It is a strategic approach with technical components such as land-use planning, infrastructure planning, education, preparedness and response.

Risk of Disaster on a particular region is the cumulative effect of probability of hazard and the vulnerability of that particular region i.e. Disaster Risk- hazard + vulnerability. It is not possible to control the hazard component, but the same can be assessed and also predicted to a certain extent. But there are measures by which our settlements can be made less vulnerable to hazards.

Disaster may be natural or man made, the scope of this paper will be limited to natural hazards only. Impact of natural hazard may be expressed as a function of intensity and frequency, i.e.  $H = f(i, n)$ . Say for a particular region, for a period of 100 years the frequency of earthquake is 2 and the intensity is I, and the frequency of cyclone is 20 with an intensity of I, then the total hazard will be  $2 * I$ , and  $h_c = 20 * I$ , respectively.

The intensity may be quantified by assessing the (i) loss of life, (ii) loss of property or fixed assets at both individual and public level, (iii) loss of livelihood and (iv) loss of infrastructure and (v) time required to restore normal daily life of the inhabitants. The vulnerability of a region may be reduced by adopting two basic principles (i) Increasing the intrinsic disaster fighting potential and (ii) Ensuring connectivity to other regions for availing external help at the earliest in cases of emergency. Disaster Risk Reduction can not prevent hazards from taking place, but we can definitely reduce the impacts of hazards.

## **Fire Following Earthquake and Role of GIS**

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Earthquake cause damage by a variety of damaging agents, including fault rupture, shaking, liquefaction, landslides, fires, release of hazardous materials, tsunami etc. Shaking is present in all earthquakes, by definition, and is the predominant agent of damage in most earthquakes. Occasionally, however, building characteristics and density, meteorological conditions, and other factors can combine to create a situation in which fire following earthquake, or post earthquake conflagration, is the predominant agent of damage. Large fires following an earthquake in a metro region are relatively rare phenomena, but have occasionally been of catastrophic proportions.

Earthquake historically has been the professional concern of seismologists and structural engineers, who as a class of professional are largely uninformed of fire. Fire protection engineers and fire service personnel have similarly ignored earthquakes, seeing their goal as the mitigation of chronic fire losses by code implementation and other technique, rather than as earthquake response.

Fires following large earthquakes are a potentially serious problem, due to multiple simultaneous ignitions which fire departments are called to respond to while, at the same time, their response is impeded due to impaired communications, water supply and transportation. Additionally, fire departments are called to respond to other emergencies caused by the earthquake, such as structural collapses, hazardous materials release, and emergency medical aid.

Fire followed by earthquake in Delhi has the potential to go well beyond the statistics of deaths and injuries. Such a disaster in the country's capital, which also happens to be a major commercial and industrial centre, will have huge economic and political implications, which will affect the entire country and not just the population of Delhi. This adds an extra dimension to the problem for Delhi. To mitigate the disaster we have to create a database, which locate all areas where the hazards have occurred and it is a useful measure for certain policy decisions. The methods make use of the visualization techniques embedded in Geographical Information System through the production of maps.

## **Micro-tremor studies of Heritage buildings**

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Micro-tremor data of any heritage building is performed to access the health of the monument. Micro-tremor data is collected using either seismograph or accelerograph. In the present case Digital Triaxial Strong Motion Accelerograph (SMA) is used to collect micro-tremor data keeping the threshold of the SMA very low. In this study the data has been collected for two monuments namely Kutub Minar and Sun Temple from Uttarakhand. SMA was kept at various places in the premises of the heritage building for some time. The data had also been collected from the surrounding ground for making comparison of ground frequency and frequency of the monument. It is well known fact that if the frequency of the structure and the ground matches then damages will be more in the eve of an earthquake. The same thing took place in Tarang Apartments in Delhi when Chamoli earthquake took place.

The results of Tarang Apartment inspired us to undertake this study for heritage buildings. The micro-tremor data analysis from these monuments has shown that the natural frequency of these monuments is same for each part of the monument and is different from the ground frequency of the surrounded area. For Kutub Minar the natural frequency comes out to be 0.8 Hz while for Sun Temple it is in range from 1.1 to 1.4 Hz. The same frequency for whole monument is a good sign for the structure, but detailed investigations for other parameters are needed to comment on the health of the monument definitively.

## **Role of theme based Regional Task Forces in enhancing international cooperation and reducing disaster risk**

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International cooperation initiatives are now new to development regime. Disaster management is one of the most gigantic task humanity is repetitively facing and multiple number of organization work individually or collectively to address the suffering communities and the governments. Mostly, these partnerships were prominent in the post' disaster phase such as Indian Ocean Tsunami, Kashmir Earthquake etc. It is very obvious for the international agencies to response to disasters and support each-others initiatives, however at times this also leads to overlapping of their work and at times creates a misleading picture as well. An examination of some of the past disasters revealed that it takes considerable amount of time to even figure out who is doing what in a disaster struck area even amongst the international agencies, donor agencies and humanitarian agencies.

However, some of the recently established partnerships among the international agencies in the pre-disaster phase are the key discussion point of this paper. This is due to the recognition of the fact that addressing the root causes of vulnerabilities and disasters are more important and is also pointed out in the Hyogo Framework of Action. One of such initiative is promoted under the umbrella of UN/ISDR through establishment of regional thematic coordination and cooperation mechanisms.

Urban risk is one of the very fast emerging threat in Asian cities. Fast pace of urbanization coupled with various social-economic processes have lead to dense urban developmental activities. No single agency can look into the matter of urban complexities and so do the international agencies. Recognizing this, to facilitate interactions among diffident stakeholders, the Asia Regional Task Force on Urban Risk Reduction is established in January 2008. The task force is' represented by 14 founding member organizations and is open for expansion. The founding member organizations include UN bodies like UNEP, UNCRD, UNU, UN-Habitat, UN/ISDR, WHO, IRP; International expert organizations in the region like ADPC, ADRC, DRI, EMI; International donor agencies like JICA; and renowned academic institutions like Kobe and Kyoto Universities. The Task Force is envisaged to act as an advocacy vehicle to major urban policy bodies, provide a platform for collective information and knowledge development and sharing, facilitate interaction and cooperation among related organizations and stakeholders.

Interestingly, this partnership of a variety of organizations will not act as an implementing body rather will promote the collective activities of its member organizations. Mapping of urban risk resilience is taken up as one of the first major activities of the Task Force. Such international cooperation initiatives in addressing communities vulnerabilities through multi-stakeholder partnership is an encouraging development and will focus not just on large scale disasters or shocks but on small scale incremental disasters or stresses *as well*. Such partnerships are expected to usher in new culture of pro-active stance in reducing risks including environmental risks various settings across geographical areas and countries. This presentation will cover how such partnerships can be made more effective and inclusive to benefit various levels of at risk communities, governments, civil societies and also existing systems of addressing disaster risk.

## **Disaster Risk Reduction through Urban Planning**

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The present day living environment has been full of disasters of one type or the other. Urban areas have become more vulnerable to disaster as the development in them is awfully affected. The risk of disaster has increased over a period of time due to over-utilization of the available natural resources, unprecedented migration from rural areas, unpalatable distribution of densely populated communities, greater unplanned/ haphazard development and sub-standard social and physical infrastructure in urban areas. As a result UNDP has also been stressing on Disaster Risk Reduction strategies since a long time now. According to UNDP, "Disaster Risk Reduction (DRR) is the systematic development and application of policies, strategies and practices to minimize vulnerabilities, hazards and the unfolding of disaster impacts throughout a society, in the broad context of sustainable development." It views disasters as an opportunity for risk reduction and development. DRR is deemed important as it would help reduce the exposure of society to the damaging effects of hazards.

Urban planning is viewed as one of the measures to reduce the risk of disaster. Applications of principles & techniques of modern urban planning, good governance and legislative controls can prove to be valuable DRR Framework to reduce the risk of disaster in urban areas. The present paper proposes urban planning and development strategies and options for integrating the related disciplines.

## **Capacity Development for Strengthening Disaster Preparedness, Mitigation and Management at the level of Urban Local Bodies**

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India has been traditionally vulnerable to different natural hazards due to its unique geoclimatic conditions. Occurrences of past few decades have well demonstrated the high vulnerability profile of country's built assets to a variety of natural hazards particularly to earthquakes. High vulnerability profile and geographical spread of seismic risk demand development of capacities amongst all stakeholders and at different levels where technical and administrative decision making takes place for creating and maintaining built assets – buildings and other structures. Efforts at national, state and local levels are imminent to improve preparedness, mitigation efforts and management strategies.

Some progress has been achieved at national level after Government has brought out Disaster Management Act 2005. Unfortunately, vision of having Disaster Resistant India has been put at back burner at the State and Local levels and action is far below desired levels.

ULBs, numbering nearly 5100 in the country, are the largest owners of life-line buildings, structures and infrastructure networks. In a hurry of achieving targets and widespread declining tendency to pay attention to details, the regulatory responsibilities at ULBs are increasingly being ignored. The result is 'Safety' and 'Quality' become first casualties both during approval and construction of the projects which belong to them or to other entities but need approval by them. Efforts so far made through development of guidelines, advocacy for adherence to standards & codes and creating awareness about consequences, the ULBs have miserably failed in changing the mind-set deep ingrained in the whole machinery.

While the country today, is witnessing a new spatial order in the growth of cities, the role and responsibilities of ULBs is increasingly becoming significant in improving preparedness and reducing vulnerability of city's built assets. With more than 300 districts in Seismic Zone III, IV and V and 180 facing multi-hazards threat, how can we continue to ignore improved management of seismic risk in our fast growing urban centres.

Emphasizing the need for capacity development four-pronged action plan has been recommended in the paper. These include (i) Periodic awareness meets at regional level for Mayors/Corporators focusing on reporting of quantifiable progress achieved by each ULB, lying in seismic regions, (ii) Regular training programmes for town planners, architects, engineers and plan approving officials for regulating seismic safety in the new projects and in methods of carrying structural safety audit of existing built stock, (iii) ULBs must collaborate with academic institutions of excellence and eminent professionals having practical experience from large construction entities to provide training to their staff and practicing local engineers and architects in structural safety auditing methods and practice of forensic engineering.