# Regulatory frameworks for reducing disaster risk through planning and building

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## Abstract

Regulatory frameworks for building and planning should be one of the key tools for reducing disaster risk in the built environment. Indeed, in most high-income nations, good regulations, which define design loads, specify construction details and provide hazard zoning have been shown to minimise damage and save lives. However, thus far, in low and middle-income nations, regulations have been less successful in reducing risk. Drawing on case studies from four countries (Turkey, Iran, Namibia, Argentina) as well as wide range of literature, this research looks at how regulations for land, planning and building can provide an enabling environment for disaster risk reduction in low and middle-income nations. The research finds that many countries are developing good regulatory frameworks, however the difficulties lie in implementation. Local governments lack budgets, expertise and general capacity to do planning that is based on sound risk information, and competing priorities for development mean that development decisions do not always place hazard risks at the top of the agenda. Furthermore, building regulations are ineffective in informal building and many local governments lack the capacity to properly check plans and construction quality. The research finds that making safe land available for development and also enabling a 'compliance culture' in building are key elements to reducing risk in the built environment.

## 1. Introduction

In what ways can government action and regulation help reduce future losses from natural hazards? In answering this question, this study seeks to draw out evidence of how regulatory frameworks for planning, land-use management and building can provide an enabling environment for disaster risk reduction in low and middle income countries. The focus of the study is on which governance mechanisms are effective for the design and implementation of plans, codes and regulations in both formal and informal settlements, with reference to the political economy conditions that contribute to this.

Urban populations will continue to increase in coming decades, especially in low elevation coastal zones and in seismically active urban areas in low- and middle-income nations (McGranahan et al., 2007; Satterthwaite, 2007; Nicholls, 2008). Given that urban areas will be growing an expanding, it is vital now to

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institutionalise good planning and building practices that take into account disaster risks. Past experience has shown us that once land is settled on, it is very difficult to move people and nearly impossible to undertake large-scale retrofitting. Thus, action is needed now to avoid disasters in the future.
In addressing vulnerability in the built environment, there are two major approaches: the first is the location approach, which is to use planning to limit the amount of development in areas that are deemed to be at risk for hazards, which is usually done though some form of land use planning. The second is the design approach, which is to make development in hazardous areas safer by altering the way buildings and infrastructure are built, usually though the implementation of building codes (Burby, 1998).

Priority Action 1 of the Hyogo Framework for Action (HFA) outlines legislative frameworks as a key basis for integrating disaster risk reduction into development policies and planning: "Countries that develop policy, legislative and institutional frameworks for disaster risk reduction and that are able to develop and track progress through specific and measurable indicators have greater capacity to manage risks and to achieve widespread consensus for, engagement in and compliance with disaster risk reduction measures across all sectors of society' (ISDR, 2005, p 6). In relation to land management and urban planning this statement of the HFA means that legislation needs to specify that disaster risks be considered in land and development planning. This includes a multi-stage approach, first of all knowing what the multi-hazard risks are through risk and vulnerability mapping; using this knowledge as the basis for developing plans and policies for land management; ensuring that the local institutions, especially local and in some cases regional governments, are sufficiently capable to implement the plans and policies.

Under Priority Action 4, the Hyogo Framework for Action also specifies: 'Land use planning and building codes', stating: 'Encourage the revision of existing or the development of new building codes, standards, rehabilitation and reconstruction practices at the national or local levels, as appropriate, with the aim of making them more applicable in the local context, particularly in informal and marginal human settlements, and reinforce the capacity to implement, monitor and enforce such codes, through a fostering disaster-resistant structures.' Furthermore the 2010-2011 ISDR Resilient Cities campaign, which offers a ten-point checklist for reducing risk in cities includes building regulations as key component stating, 'Apply and enforce realistic, risk compliant building regulations and land-use planning principles.' (ISDR, 2010)

## 2. Methods

An earlier version of this paper was written for the 2011 Global Assessment Report for the United Nations International Strategy for Disaster Reduction, and synthesised the findings from five commissioned case studies and one expert meeting. The case studies commissioned as part of this study focus specifically

on the design and application of regulatory frameworks for planning and/or building in particular countries, cities and communities, including Turkey, Argentina, Namibia and Iran.The case studies, accompanied by other literature, are used to draw out the main issues and considerations of how planning and building regulations are contributing to disaster risk reduction. The excerpts from the commissioned case studies and other published works are used throughout the paper to present evidence of the findings. The paper has been published in Spanish in *Medio Ambiente y Urbanización, vol 75, no1, Dec 2011.*

The study is divided into two main parts, the first part is concerned largely with planning and land management and the second part looks at regulations for buildings and disaster resistant construction.

## 3. Planning and Land Management

The findings from the case studies indicate a number of common regulatory and governance issues with regard to urban planning and land management, including the importance of regional level coordination for disaster risk reduction, having multiple stakeholders involved in developing regulations and the differences between reactionary laws and strategic laws. The case studies also show that the effective implementation of regulations remains a major challenge for local governments and that the most important thing municipalities and governments can do in growing cities is to make safe land available for building.

### 3.1 Need for regional-level coordination

A level of regional coordination in planning is effective for enabling risk reduction, and in large urban centres this may entail the coordination of planning across metropolitan areas. This regional planning jurisdiction also aids in the preparation of uniform disaster risk mapping for earthquakes and in prioritising high-risk areas for intervention. For example as detailed in the Istanbul case study, enlarging of the municipal boundaries to match the provincial boundaries has enabled the municipality to plan for the larger region and to better coordinate its activities with the provincial-level administration. A United Nations University (UNU) study, which looked at social geography of urban disaster vulnerability found that out of the four megacities included in the study, Tokyo, Los Angeles, Manila and Mexico City, the municipalities with legally established, strong and well-financed metropolitan government structures, those being Manila and Tokyo, allowed for more inter-sectoral and intercity coordination for disaster mitigation planning (Wisner and Uitto, 2009).

For risk reduction, the acknowledgement of the region of the physical geography of risk is important, i.e. management of a flood plain in its entirety (Burby, 1998). The case study from northern Namibia offers the example of how a lack of regional level planning can result in the transfer of risk from one place to another. As it details, the

towns of Ondangwa and Oshakati each have their own plans for dealing with the flooding, but the plans for both towns are isolated, designed solely for the purpose of dealing with floodwaters in the locality of their respective areas. For example, the channel that is proposed to manage the floodwater in Ondangwa drains directly into a village south of the town, exacerbating the flooding there (Gold, 2010).

Multiple Stakeholders in planning

Methods for integrating risk reduction into planning outline the importance of combining local knowledge of individuals and communities at risk with scientific information and also highlight the importance of equality in participation in decision-making across genders, religious and ethnic groups (for example, Wamsler, 2008 or Maskrey, 1989). One of the common methods for gaining broad-based representation in planning for disaster risk reduction is having an advisory committee of the major stakeholders that can advise on legislation and policies at the national level and at the regional, local and district level may assist the governing body on developing and implementing land use plans or formulating projects related to disaster risk reduction (Burby, 1998; Pearce, 2003). An advisory committee would normally include representatives from government departments, representatives of community-based organisations and civil society, experts, and those representing private interests.

The case studies show that legislation and regulation regarding the participation of multiple-stakeholders in planning and development is becoming more commonplace. In practice, however, the preparation of plans and projects related to risk reduction still tends to be technical and is in most cases handled solely by government agencies. Although there are many positive examples, the inclusion of multiple stakeholders, such as advisory committees or community-based initiatives, is either limited or these perspectives are not yet implemented in the majority of urban areas.

For example, as documented in the Namibia case, in the Oshana region, a Regional Disaster Risk Management Committee was established from 2008, to co-ordinate the management of the flooding as well as supply of emergency services. This committee is centred on the ministries, regional and local government and it did not include the broader spectrum of stakeholders, such as representation by the informal settlements affected by the floods (Gold, 2010). Similarly in Turkey, a new legislation at the municipal-level regarding mandated citizen participation in urban development objectives through Citizen Councils (Kent Konseyleri) in district municipalities. However, in most cases, Kent Konseyleri is still only existing only on paper, or advertised on websites (Yönder and Türkoğlu, 2010).

Reactionary laws on land use vs. strategic guidelines for achieving risk reduction

Often, legislation that prohibits certain land uses in areas determined to be at risk have been reactionary, coming as amendments to existing laws in reaction to a recent disaster event that has exposed the risk in that area. For example, as detailed in the case study on Argentina, in 1957 following severe flooding in the region, the Province of Buenos Aires enacted a provincial law that established minimum distances and heights from water bodies for all developments. This was accompanied in 1977 by another law which created strict regulations for minimum plot sizes and

infrastructure. After these laws, the costs of purchasing the plots increased to such an extent that that large sections of the lower-income population could no longer afford to purchase plots (Almansi, 2010).

These reactionary laws enacted after a disaster are positive in that they recognize the risks as a land use problem and enact preventative zoning to regulate the development in high risk zones. However, these laws can have adverse effect on the poor, making it unaffordable for the poor to obtain legal land, because regulating land through zoning laws (which detail specific distances, sizes and heights, etc.) are very in-flexible in terms of accounting for other realities of development. These types of prescriptive laws do not account for increasing land costs or people's abilities to pay. Nor do they account for environmental variations in the possible levels of flooding or the possibility that it may be feasible to make some land habitable through other mitigation measures, i.e. drainage, pumping, embankments. Ideally, legislative frameworks that are more flexible in their application may be better for managing risk if they can be applied diligently.

More recent legislations regarding risk reduction and land-use, such as those described in the case study of Turkey, are less specific in terms of prescribing exact zoning regulations and thus have the possibility to offer more flexibility in terms of how legislation is implemented. Yönder and Türkoğlu (2010) outline how, in Turkey, the law requires that geological studies be prepared by the Ministry of Public Works and Settlements prior to plan preparations in order to help identify areas where no development is allowed. In municipalities over one million people, environmental plans must be superimposed on micro-zone risk maps.

This may have more positive impacts in terms of tailoring development to local needs and priorities as they change over time. However, this legislative approach requires a more sophisticated decision-making mechanism at the project or plan approval stage, and decision-making can become politically motivated. For example in Turkey it has been found that municipal council decisions may still allow development in unsafe areas or at higher densities than allowed in the plans. Such decisions have also in some cases been supported by the Central Government's Disaster and Emergency Management Authority –AFAD. For example, in 2010, a decision by the AFAD reduced the 150-meter wide no-construction buffer zone along the local fault line in Sakarya-Akyazı to 20 meters. Furthermore, in March 2010, the municipal council in Burdur rejected a development plan revision that incorporated the local fault line and the no development buffer zone into the plan (Yönder and Türkoğlu 2010).

### 3.2 Implementation of plans and regulations

Even though legal frameworks and plans that provide an enabling environment for risk reduction may be in place, it becomes the responsibility of the local/municipal government to implement the measures. From a multi-year study looking at land-use planning and hazards in the United States context, Burby (1998) comes to the

conclusion that the critical barriers to local government implementation of land use planning for risk reduction is based on two distinct, yet inter-related factors, those being commitment and capacity. Most local governments may lack commitment to disaster risk reduction because in their context other concerns such as basic infrastructure, unemployment, housing and education are much more critical. Local government are more willing to advocate measures if their constituencies suffer chronic losses from disasters. Most local governments struggle with having the capacity to implement measures, which is usually due both to a lack of expertise and lack adequate staff to undertake reviews and inspections.

In the past, there has been an operational and professional separation between urban and regional planning and disaster management. Although bridges across these disciplines are being made, a divide is still prevalent in most governments. Disaster management has been the domain of government civil protection units and has generally been focussed on contingency planning to respond to disasters. In the past, urban and regional planning has engaged little with aspects of disaster risk, except in the aftermath of a disaster. While government initiatives to mainstream activities for reducing disaster risk into urban and regional development is becoming more commonplace, there are still traditional divides between the ways the government departments are organised and also in the background and the training of the staff (Pearce, 2003). For example in Turkey, preparation of disaster risk maps is now conducted under the AFAD, but the Ministry of Public Works and Settlement oversees land use planning, development and building controls carried out by municipalities. Thus, in Turkey, as in many other countries, there are essentially two different Ministries carrying out the activities related to land use planning and to disaster risk reduction.

Another aspect illustrated by the case studies, follows on from the point made by Burby (1998) about capacity – that local governments are responsible for approving development projects and building plans and they are the front-line of risk reduction in planning and building. However many local governments, especially in smaller towns or poor districts, do not have adequate staff with the adequate technical capacity. Hardoy & Pandiella (2009) in a study looking at urban poverty and vulnerability to climate change in Latin America conclude that disaster risk is shaped by, “the long-evident incapacity of governments to address risk and to integrate development with the reduction of vulnerability. Meanwhile, within local governments, there is generally an institutional incapacity to address this issue or to control pollution and protect natural resources " (p.204). A study looking at flooding in African cities concludes, "local authorities are best placed to cope with flooding from small streams whose catchment areas lie almost entirely within the built-up area. They administer the regulations and by-laws concerned with land use planning and should be involved in local disaster management. However, most African local authorities lack the human resources and financial power to carry out such responsibilities effectively. They may be able to form partnerships with NGOs but they should be supported by national governments and regional agencies to map

flood risk areas, maintain urban stream channels, control building in flood channels and on floodplains and provide emergency assistance" (Douglas et al., 2008, p. 203)

In some localities, the need to satisfy short-term concerns for profits or for other development needs underwrites the decisions of municipalities to uphold disaster risk reduction measures, especially in localities where there are not frequent disaster events. In a study looking at earthquakes and urban planning in Turkey, Sengezer and Koç (2005) provide an interesting account of planning processes in seismically active cities of Erzincan, Adapazari and Avcilar (latter is now a district of Istanbul). In each of the areas, the earthquake risks where well-understood and urban plans accounted for risk reduction either by limiting building heights, types and densities or encouraging development in areas with more stable soil conditions. However in each of the cases, the pressures to offer higher densities as the populations expended, made it so that subsequent planning decisions allowed for relaxation of these regulations, even though the areas were at high risk (see Box 1).

**Box 1: Tracing the development decisions that lead to risk in urban areas: case of Adapazari, Turkey**

In another example in Adapazari, a city in the north-western Marmara region of Turkey, has suffered earthquakes in 1943, 1967 and in 1999. After the 1943 earthquake, the 'Adapazari City Development Commission Report' recommended that the city be expanded to the terrace areas to the south-west of the city, which it was observed had undergone less damage in the earthquake and delimited areas which should not develop due to unstable soil and high ground-water conditions, especially along the rivers. A plan produced in 1957 complied with these recommendations. In 1957 the population of the city was 65,000 and the density was 100 persons per hectare. After the earthquake of 1967, it was suggested that the height of buildings should be limited to three storeys, as it was the higher buildings that proved to be more vulnerable in the earthquake. By 1985 the population of Adapazari had reached 200,000. The development plan of 1985 called for development towards the riversides, violating the principles of the 1957 plan, which had prohibited construction in this area due to geological concerns for earthquake risks. In the 1990s, growth of industry in the city increased, including the opening of the Toyota automobile plant, and most of the industrial parks were located in the alluvial agricultural areas. By 1997, the population had reached 300,000 and the density was 350 persons per hectare (up to 600 persons per hectare in the city centre). In the 1990s, 'numerous modifications to plans, some of which where limited to an avenue, a street, or even a building lot, were made in order to increase building densities regardless of ground conditions and the risk of an earthquake' (Sengezer and Koç, 2005, p. 178).

### 3.3 Security of tenure, evictions and risk reduction

Security of tenure in informal settlements generally enables investment in infrastructure and in better housing quality, thus reduces risk to flooding, fires and other hazards. For example, the PROMEBA programme in Argentina, which

facilitates upgrading of informal settlements has been able to reduce risk in informal settlements through upgrading that enables legalisation of land tenure (Almansi, 2010).

However findings from the case studies indicate that regulatory frameworks may, in some situations, negatively impact on the security of tenure of informal settlements. In the cases presented here, there are examples of regulations that aim to prohibit development in hazardous areas (location approach), or seek to replace informal settlements by higher income uses in which the designs and new construction can be made to a hazard-resilient standard (design approach). In both of these situations, legal tenure cannot be granted to settlements already located in these areas and in some situations former tenure arrangements may even be revoked in an effort to reduce risk, meaning that those settlements cannot upgrade, or are removed or both. In most situations, given the choice, people would choose to remain where they are. Relocation often means that people are living in areas further from livelihood opportunities and do not receive just compensation for what they have had to leave behind (Cabannes, Yafai and Johnson, 2010).

The case study in Namibia explains that in Oshakati, subsequent to the master plan developed for the city by external consultants, the town council has prohibited permanent construction in Oshoopala settlement, as this settlement will be re-developed into middle and high-income housing. It is likely that the current informal settlement in Oshoopala will be resettled in another area (Gold, 2010). In Buenos Aires a similar situation is true. Legal restrictions for land use, building and hydrology make it so that informal settlements formed in areas in which development is restricted because of flood risk have not been able to achieve security of tenure (Almansi, 2010).

In Istanbul, Turkey, the earthquake mitigation strategy is to improve the resilience of the largely informally built housing stock through the demolition of these settlements and the construction of new buildings in their place. This is done under a newly established legal framework on urban transformation, which gives municipalities the power to rehabilitate urban areas based on disaster risk. However, under these urban transformation projects the new houses are unaffordable for the original occupants of that land, who are generally relocated to the periphery areas of the city. Even then many people cannot afford the price for the new houses that they are relocated to (Cabannes, Hasan and Baysal, 2008).

Work of the Philippines Homeless People's Federation illustrates that it is possible that people will voluntarily resettle to other lands if there current areas are at high risk and if they can negotiate or find good conditions for resettlement onto safe lands. Having a strong community-based organisation enables this kind of articulation of needs and negotiation. In Iloilo, Philippines after Typhoon Frank inundated many coastal settlements in June 2008, the Philippines Homeless People's Federation were able to negotiate with the municipality to relocate almost 2000 families to safer lands in San Isidro (Dodman, Miltin and Rayos Co, 2010).

### 3.4 Safe Land

Once people have settled on land, resettlement is often not possible because of social pressures for people to stay on the land that they have occupied for many years. Thus, as urban areas continue to grow, people need land to settle on that is safe from disasters. In many cities, the provision of safe land is the most vital aspect that local governments can undertake for controlling disaster risk in urbanising areas going forward. This entails developing the regulatory mechanisms that enable the urban poor access to land that is not in high-risk areas and regulations that allow them to have tenure security, both for business and housing, in an affordable manner.
In Windhoek, the capital city of Namibia, with a population of 223,000, a network of urban poor groups, Shack Dwellers International, has been working with the local government as well as NGO professionals to develop progressive regulations for land and housing policies, which is enabling people to access safe land in an affordable manner. In Windhoek, 26 percent of people are living in informal settlements and thus the policy revision came about in part because of the recognition that former housing policies were not working for the very poor and were making health conditions worse for them. Under the new policy, the municipality recognizes the different levels of affordability that households have and makes propositions for types of tenure based on affordability. Changes to the tenure laws allow the very poor to access land by making it possible to have more than one family sharing ownership of a plot. Plots sizes have also been reduced so people can hold titles to smaller plots, depending on what is affordable. One aspect that makes this policy possible is that there is no value placed on the land, and the municipality is only interested in cost recovery of the services it installs (Mitlin and Muller, 2004).

## 4. BUILDINGS AND CONSTRUCTION

In US, UK, Japan and Australia good regulations, which define design loads, specify construction details, provide hazard zoning have been shown to minimise damage and save lives (Spence, 2004). However benefits of regulations are less clear when concepts and prescription of advanced codes are transferred to countries less able to apply them rigorously. Another problem with the application of codes in many low and middle income countries is that attaining standards increase costs of building beyond what poor can afford.

In informal settlements for example, people prefer upgrading rather than construction on a new piece of land partly because they are then less constrained by building codes & planning regulations. In a new site, they must meet all these standards, but in incremental buildings these are not necessary, thus it is much cheaper to build there. In some instances, people are able to adapt their building methods in informal settlements to reduce risk for more frequent disasters (i.e. annual flooding in Dhaka, Bangladesh) (Jabeen, Johnson and Allen, 2010).

### 4.1 Appropriate codes and standards

While most countries do have building codes of some kind, the challenge is to develop codes that are appropriate for the local economic and environmental conditions and that respond to current building practices and technology.

Findings from a multi-country study by Practical Action, looking at the design and application of building codes in low-and middle-income nations concludes that codes need to be locally developed and related to the local system of design and building so that they match the capability of the local professionals or those who will be applying the code (Yahya et al., 2001). In many countries, codes have been directly transferred from the colonising country and few revisions have been made; building to the standards of the codes is not affordable by half the population. Very often they do not allow incremental development, going for a uniform solution that is trying to suit everybody. In other countries, each time there is a disaster event, new aspects of the code are added, and codes have become increasingly sophisticated requiring specialists to decipher them. In some cases, simple 'deemed to satisfy rules' whose application is obvious (e.g. limiting storey heights, prescribing positioning and size of openings) might be more appropriate than more complex performance specifications. It is generally easier to modify rules than to train and employ a cadre of professionals to apply and police codes that are unrealistic.

An example from Bangladesh shows how codes are in direct contradiction to what people actually live and build. The Bangladesh National Building Code (BNBC) identifies only government bodies or public agencies to be responsible for planning minimum standard housing development for the low-income people in urban areas. It defines the minimum standard housing to have a density of 75 units/hectare with average 5 persons/dwelling. The minimum plot size varies between 30 sq. m to 25 sq. m in dense metropolitan areas. Minimum width of walkways is to be 3 m while the requirement for infrastructure follows the regular development requirements. Individual plot can have maximum of 75% land coverage with 1.5 m open space at the front. Minimum size of the 1st habitable room is 9 sq. m and the 2nd, 6 sq. m making of 15 sq. m in total. There is no option of incremental development to improve living environment while still living in self built construction. Also there are no considerations about addressing risk varying in different locations (Jabeen and Mallick, 2009).

The photograph below shows an example of how people can realistically afford to live in an informal settlement in Mohammedpur, Dhaka. In these rental units, families averaging six to eight people in size are living in a 9 sq. m one-room dwellings cantilevered over the water (thus there is actually even no plot of land). The walkways are 1.5 metres and there is no outside space.

Figure 4: Informal settlement in Mohammedpur, Dhaka does not conform to Bangladesh National Building Code (source: Huraera Jabeen)

In Gujurat, two municipalities, Bhuj and Anjar, which were the worst affected in the 2001 earthquake, decided to simplify the rules for reconstruction, prohibiting all construction higher than two stories. The rational was that they were more accessible for people and could be simplified in terms of procedures (Spence, 2004). In the long term, this kind of standard may not be realistic given required urban densities, however it does illustrate the point that simple and achievable standards may be better at achieving risk reduction than those that are too sophisticated to be implemented properly.

### 4.2 Application and enforcement of building standards

The damage from many large-scale disasters, especially for earthquakes can be partly attributed to the lack of application of building codes-- the failure to enforce codes and to verify the quality of construction during the building period. Building supervision and site inspections of the building process can be marred by lack of capacity to do checks or sometimes corruption. This appears to be especially important when reinforced concrete is being adopted as a new building technology in urban areas, as we have witnessed from most of the intensive earthquake disasters in the last ten years.

In Turkey after the earthquake in 1999 in the Marmara region caused the collapse or severe damage of one hundred thousand buildings, it became apparent that a new regulatory system was required to ensure that buildings would be built safely. In the previous system, building plans are submitted to the municipal authorities with the signature of a design engineer who is responsible for code compliance. In practice however, municipal engineers were not able to check thoroughly all of the design calculations and workmanship because of their heavy workload or lack of professional qualifications. Under the new system it was proposed that a private firm charged with building construction supervision would assume the functions of the municipality in checking both the design calculations and the actual construction activity at the building site. In that regard the firm served as a public agent ensuring that materials, workmanship and detailing requirements were fulfilled. The firm needed to have a ten-year duration liability insurance coverage for each job that had been tasked to it. Even though there was a lot of momentum behind developing a accountable system in the wake of the destruction from the earthquake, interestingly, the new system ultimately failed to be passed into law, due to lack of support by some interest groups and the fact that such far reaching changes to the system also required changes to civil law, commercial law and insurance laws (Gülkan 2010). Thus even though there may be a strong commitment to making the necessary regulations for enforcement of codes, and ultimately for risk reduction, the political and economic realities of getting laws passed and implemented can sometimes cloud the good intensions.

Several case studies make the point that the process of obtaining building and planning permissions is extremely complicated, time-consuming and therefore expensive. The end result of these lengthily procedures are that builders prefer to construct outside of the official processes, and thus buildings do not conform to codes or standards. Of all the regulatory constraints, it seems that onerous administrative procedures are invariably one of the greatest barriers to conformity of building codes. In Peru, for example, in the historical centre of Lima, it was identified that to obtain an Automatic Building License requires an average of 222 working days (311 calendar days) under optimum conditions. Standards are so high and regulations so rigid that owners prefer to let buildings collapse (Payne, 2010).
A study about the experiences of the Philippines Homeless People's Federation in community-driven response to five disasters which impacted on low income groups in the Philippines (the Payatas trash-slide in Manila; the landslide in barangay Guinsaugon; the Mount Mayon mudflow and floods: the fire that devastated the Lower Tipolo Homeowner Association land in Cebu; and the flashflood in Iloilo) identifies that regulations are one of the limitations inhibiting community-based response. Stringent land use subdivision and conversion regulations inhibit local governments being able to make land available for people to settle on for temporary and permanent housing. Delays and difficulties in processing land and housing permits, obtaining clearances for developing relocation sites identified and acquired by communities, and getting agreement and official permission for needed actions that often require the agreement of many different bodies were some one of the difficulties that the Federation faced in the different disaster situations. The study

recommends that one of the important things it can do to help communities recover is to change government policies to streamline these processes into a one-step process to make it simple and faster for people to build (Rayos Co, 2010).

### 4.3 Advocating a 'compliance culture'

There is a general paradigm shift away from policing of building codes to developing a basis of awareness and education about safe building methods. The cultivation of a 'compliance culture' is being advocated by several international groups which have been working on the application of building codes in low and middle-income countries, including the Global Task Force on Building Codes (GTFBC) (de la Pomerai, 2010), Practical Action's work on Building codes in Africa, and by the Royal Institute of Chartered Surveyors (RICS) in the UK (Kataria 2010), the latter which has been doing work on codes in Haiti since before the earthquake. The case study from Iran also mentions these the need for a trained and skilled labour force as one of the major challenges for implementing the earthquake standard (BHRC, 2010). The major impetus behind this shift is that in order to 'police codes' it requires that buildings are built through formal means, obtaining the required permits, and that the institutional basis at the local government required for checking designs and construction is enough to cope with the demands of the on-going construction. As has been shown in this paper, all of these aspects are problematic due to the fact that local governments do not have the capacity to meet the demands of policing codes and regulating all building. Furthermore, a substantial amount of construction is informal and thus outside of any regulatory controls.

## 5. CONCLUSIONS AND RECOMMENDATIONS ARISING FROM THE STUDY

Some recommendations regarding the use of regulatory frameworks for achieving disaster risk reduction are clearly highlighted by this study:

Enabling access to safe land. Making safe land available for development so that people can build in areas that are less exposed to hazards. In the context of urban growth in hazard prone areas, the simplest solution is to make safe land available in the beginning, so that expensive structural measures (or resettlement programmes) are not required later on.

Adopting regulations that require less oversight from government. Municipalities and local governments have limited resources and competing priorities for development. Instituting regulations, which require less government control to supervise, yet result in risk reduction is a better alternative to complicated regulations, which cannot be feasibly followed up or implemented by local governments. Examples of regulations which require minimum oversight include: making access to safe land (if people are building on land that is already safe than building controls become less important), simple building codes and planning regulations, i.e. 'deemed to satisfy' standards,

and developing a culture of compliance to building standards through education about safe building practices for builders and for general public. Investments in stricter planning and building controls can then be instituted only for larger engineered structures, for public buildings and larger infrastructure works.

Need for investments in the capacity of local governments to plan for and encourage safe development. It is the local governments that are at the front line of decision-making and implementation for planning and building regulations, however, as the case studies have shown, regulations require technical expertise to develop and manpower to implement. In most municipalities in low- and middle-income countries, municipalities are lacking the capacity to plan, implement plans and encourage safe development. Laws and policies are required at the national level that enable local governments to take responsibility for planning and building and include budgets and resources that assist local governments do this.

More specifically, this study has highlighted a few areas where investments in capacity at the local level are necessary for disaster risk reduction in planning and building:

- Multi-stakeholder development of plans and codes: urban and regional plans and building codes or standards which respond to the needs of multiple stakeholders will be more likely to be adopted and result in overall risk reduction. This kind of planning or revision of codes requires sometimes a change of approach at the local level, a technical capacity to integrate the multiple perspectives and also requires time and budgets to undertake the activities.
- Supervision of building process for engineered structures: implementing set of regulations that enable accountability for the design and building of engineered structures. If this is local government, ensuring that local government has the technical and staff capacity to undertakes these checks.
- Safe building practices for non-engineered structures: increase the capacity of local government to raise awareness about safe building practices. This includes using media and pamphlets for raising awareness of safe building methods, investing in training at community-level and training of building professionals and across government departments. This kind of approach can also be implemented by non-governmental groups and supported by other levels of government
- Streamlining of permits and land development processes: The process of getting permits for building or land in many municipalities is time-consuming. The end result can be increased risk as more buildings are built outside the formal system with little application of building standards. Local governments need to look at this system and where possible revise the system to make it easier for people or for developers to obtain clearances for building.

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