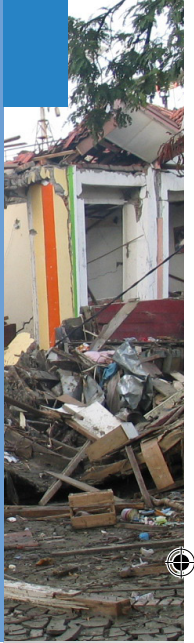


Mainstreaming Disaster Risk Reduction in Housing Sector

Under the Regional Consultative Committee on Disaster Management (RCC) Program on Mainstreaming Disaster Risk Reduction into Development in Asia



Regional Consultative Committee on Disaster Management (RCC)



RCC Members: Islamic Republic of Afghanistan, People's Republic of Bangladesh, Kingdom of Bhutan, State of Brunei Darussalam, Kingdom of Cambodia, People's Republic of China, Georgia, Republic of India, Republic of Indonesia, Islamic Republic of Iran, Hashemite Kingdom of Jordan, Republic of Kazakhstan, Republic of Korea, Lao People's Democratic Republic, Government of Malaysia, Republic of Maldives, People's Republic of Mongolia, Union of Myanmar, Federal Democratic Republic of Nepal, Islamic Republic of Pakistan, Independent State of Papua New Guinea, Republic of the Philippines, Democratic Socialist Republic of Sri Lanka, Democratic Republic of Timor-Lesté, Kingdom of Thailand, Socialist Republic of Viet Nam

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The team at ADPC involved in developing this Guideline includes Sudhir Kumar, Rohan Cooray, Anisur Rahman, Gabrielle Iglesias, Khondoker Golam Tawhid and Arghya Sinha Roy.





Contents

SECTION 1

BACKGROUND 4

Aims and objectives 5

Target group 5

Scope of the document 5

SECTION 2

INTRODUCTION 7

IMPACT OF DISASTERS ON HOUSING 9

Understanding typical vulnerabilities contributing to housing damage from disasters 11

Understanding the process of development in housing sector 12

What does it mean to mainstream DRR in housing sector? 14

SECTION 3

APPROACHES TO MAINSTREAM DRR INTO HOUSING 18

Housing Development Framework to act as Enabling Environment for Mainstreaming DRR 19

Institutional Framework 19

Policy Framework 20

Regulatory Framework 23

Legal Framework 25

Components supporting Housing Development to act as Entry Points for Mainstreaming DRR 27

Land 27

Finance 29

Labour 30

Building Materials 31

Infrastructure 32

REFERENCE 33





SECTION 1

Background

The Regional Consultative Committee (RCC) on Disaster Management under its programme on Mainstreaming disaster risk reduction into development (MDRD) have identified Agriculture, Education, Housing, Health, Roads and Infrastructure, as priority sectors to initiate mainstreaming disaster risk reduction (DRR) into development. The RCC comprises of heads of the National Disaster Management Offices of 26 countries from Asia and the Pacific region. ADPC acts at the secretariat to the RCC and its program on Mainstreaming DRR into Development.

The RCC MDRD Program has five components namely:

1. Undertaking Priority Implementation Partnership on Mainstreaming DRR into National Development Planning Processes
2. Undertaking Priority Implementation Partnerships on Mainstreaming DRR into Sectoral Development Planning Processes
3. Advocacy for building awareness and political support for Mainstreaming DRR into Development
4. Knowledge Management Platform for Mainstreaming DRR into Development; Showcasing good practice and lessons learned
5. Capacity development for mainstreaming DRR into development

One of the approaches identified under the program is to develop RCC Guidelines on Mainstreaming DRR into national and sectoral development planning process. The primary objective of the Guidelines is to provide guidance to the RCC members and concerned sectoral ministry/agency on possible approaches for mainstreaming DRR in the concerned sector. The Guidelines are based on the experiences of the RCC member countries undertaking Priority Implementation Partnership (PIPs) under the RCC MDRD Program as well as their other experiences on similar topic.

This guideline is specific on the theme of mainstreaming DRR into Housing Sector. It is aimed to provide a general overview of mainstreaming DRR in housing and not very country-specific as in the case of PIPs.



Aims and objectives

This Guideline aims to focus on the following:

- Linkages between disasters and housing and the rationale for mainstream DRR into housing;
- Provide possible approaches (entry points / enabling environment) as guidance to government officials for mainstreaming DRR into housing or in other words how could government officials involved in housing related agencies be involved in reducing underlying vulnerability and drives related to housing sector;
- Provide examples from various RCC member countries where initiatives have been undertaken to mainstream DRR in housing sector.

Target group

The document is primarily aimed for:

- **Government officials** (including technical professionals, engineer, architects and planners) working in Housing related agencies as well as officials in the approval agencies at local and national levels in RCC member countries;
- **Officials from the National Disaster Management Agencies in the RCC member countries** for advocating with their counterpart Housing agencies on the issue of mainstreaming DRR into housing sector;
- **Institutes of architects and engineers** or relevant institutes in RCC countries;
- **Donors and other development agencies** working in the field of housing.

Scope of the document

Housing / Shelter is considered as one among the three basic human needs next to food and clothing. Importance of housing cannot be understated as it is a key factor determining a person's health, wellbeing, and prospects in life.

Adequate housing is not just limited to physical structure. Adequate housing means adequate privacy; adequate space; physical accessibility; adequate security; security of tenure; structural stability and durability; adequate lighting, heating and ventilation; adequate basic infrastructure, such as water-supply, sanitation and waste-management facilities; suitable environmental quality and health-related factors; and adequate and accessible location with regard to work and basic facilities: all of which should be available at an affordable cost. Adequacy should be determined together with the people concerned, bearing in mind the prospect for gradual development (UN Habitat Agenda).



While this document addresses various aspects of housing such as planning, social, and technical issues, it is not meant to be a technical design document wherein technical details such as structural codes, appropriate design guidelines, building specifications and so forth are discussed. Within the scope for the target groups, the document is more attentive to the official realm of housing development process such as policy makers, planners, officials involved in preparation of housing planning, design till the final approval procedure.

Secondly, while housing is not always limited to Government housing schemes, this document focuses to a large extent on national housing programmes.

Last but not the least, this document serves as a broad general guideline which is intended at a regional level and therefore not country-specific. However, several case examples have been derived from RCC countries.





SECTION 2

Introduction

Everyone has the right to adequate housing for health and well being [...] enshrined in the article 25 (I) of Universal Declaration of Human Rights. Housing has close relationship to a person's life, livelihood, health and overall well-being and therefore directly includes the social themes of vulnerability, social protection and livelihoods (Christine Wamsner).

Box 1. Housing in Indonesian society

In the Indonesian society, housing as a shelter reflects the level of living, welfare, safety, personality and culture. Housing cannot be seen merely as a living and infrastructure/facilities function, but also as settlement process and as facilities for people to communicate with the environment (neighborhood, society, nature surroundings). So housing is a means both to actualisation of the individual and to integration with environment (Pembangunan Perumahan, 1994).

Source: Ngakan Ketut Acwin Dwijendra, Quality of low cost housing settlement project -2004

While housing is an individual activity, national governments have attached significant importance to provide adequate shelter to ensure wellbeing of its citizens. Over the past few decades, governments have invested considerable resources to provide housing through national programs to vulnerable groups (especially poor) and also to meet housing demand due to population growth and rapid urbanization. However the supply side of housing were grossly inadequate, and in 1988 the United Nations General Assembly adapted the Global Strategy for Shelter to the Year 2000 (GSS) which lead to changing the role of government from "provider" to "enabler" of housing development services. While investing in housing has multiplier effects on economy, it also enables to improve human development and meet the Millennium Development Goals (MDGs).



Table 1. Average annual public housing expenditures on Housing during 2000-2007.

Country	Average annual public housing expenditures on Housing, 2000-2007 (% of GDP)
Singapore	2.980
Nepal	1.482
Mongolia	1.206
Indonesia	1.012
Sri Lanka	0.758
Thailand	0.742
Malaysia	0.383
Bangladesh	0.354
Philippines	0.089

(Source: ADBI Working paper 145: Patterns of Inclusive Growth in Developing Asia: Insights from an Enhanced Growth-Poverty Elasticity Analysis)

On average governments in the region have invested around 0.08 to 3.0 % of their GDP in housing related services between 2000 and 2007 (Table 1), however it was grossly inadequate to meet the housing demands in many countries. According to the UN Habitat more than a billion people around the world live with inadequate housing and by 2030 it would be about 3 billion people, or about 40 per cent of the world's population. Urban areas are facing the brunt of inadequacy in demand and supply and leading to informal and underserved settlements and slums. While the governments are tackling the housing shortages by facilitating and implementing enabling shelter strategies, concurrently governments increasingly have to deal with housing reconstruction arising from natural disasters. Following section discusses the impact of natural disasters on housing and economic development.

Impact of disasters on housing

Housing is often the sector severely impacted by both hydro-meteorological and geophysical disasters. Table-2 shows the major disaster events during 2001-2010 and corresponding damages and economic loss to housing sector in Asia-Pacific region¹. Damage to housing sector includes both private and government and in most cases governments have to provide assistance for the damages associated with private sector housing damages.

On a micro scale, disaster event disrupts day to day life and leaves the families without shelter and results in lack of access to basic services such as water and sanitation. In addition, micro, small and medium-sized businesses located in those homes are similarly affected indirectly and the family could also be bereaved of the chance to be eligible for loans since one of the key assets or collateral is demolished, making it difficult for them to recover from the loss. Lessons from past events have shown vulnerable groups face various protection related problems aftermath of disaster events.

With limited resources and options, recovery processes of individual households are contingent upon their coping capacity and the external support. Further, the community as a whole also suffer as the local economy is hard hit and the responsibility to support those made homeless by the natural disasters can place extra burden on the dwindling economy. *Box 2* below further describes the impact of homelessness on economic development.

Box 2. Impact of Homelessness on Economic Development

- **Direct effects:** material losses of housing assets actually destroyed or damaged.
- **Indirect effects:** costs of lost and interrupted production and services through economically active homeless being unable to work.
- **Secondary effects:** can include: (i) failure to meet long-term development goals as resources are reallocated to emergency housing; (ii) unforeseen deficits in public finances and balance of payments; (iii) possible fall in productive investments as investors factor in disaster risks.

Source: *Doing More for Those Made Homeless by Natural Disasters: Disaster Risk Management. Working Paper Series No. 1 (2001) World Bank*

¹ Based on Post Disaster Needs Assessment (PDNA) and Damage and Loss Assessment (DALA) reports

On a macro scale, housing sector accounts for 10-50% of total disaster losses (Table 2). While, high impact events (Intensive risk events) as below not only result in significant housing damage and economic loss they also account for majority of the deaths. For countries that suffer disasters year after year, this can leave regular development programs in a constant state of flux as they are repeatedly raided for resources to help pay for unexpected reconstruction (The World Bank, 1999).

Table 2. Damage & Losses in the Housing Sector:

Year	Country	Type of Disaster	No of Housing Units		Housing sector damage and losses (US \$ in Mn.)	Total damage and losses (US \$ in Mn.)	% of total loss
			Fully Damaged	Partially Damaged			
2001	India (Gujarat)	Earthquake	410,482	488,350	1100	2130	51.60
2004	India (Tamilnadu)	Asian Tsunami	153,585	-	228.5	815	28.04
	Indonesia	Tsunami	127,300	-	1437.1	4452	32.28
	Sri Lanka	Asian Tsunami	99,480	44,290	306-341	970-1000	31.55-34.10
	Maldives	Asian Tsunami	1,847	3,500	64.8	470.1	13.78
2005	Pakistan	Earthquake	203,579	196,574	1152.1	2876.0	40.06
2007	Bangladesh	Cyclone Sidr	564,967	957,110	839.0	1674.9	50.09
2008	Myanmar	Cyclone Nargis	450,000	350,000	623.6	4060	15.36
2009	Bhutan	Earthquake	446	4168	23.3	52	45.81
	Lao PDR	Typhoon Ketsana	3,178	-	8.6	58	14.83
	Cambodia	Typhoon Ketsana	218	10,559	18.5	131.996	14.02
	Philippines	Typhoon Ondoy and Pepeng	220,000	-	730.3	4383	16.66
2010	Pakistan	Floods	913,307	694,878	1,588.0	10,056	15.79

Source: PDNA and DALA reports

The UN Global Assessment Report on Disaster Risk Reduction 2011 (GAR 2011) provides an interesting insight into the damage and loss associated with natural disaster events based on available disaster data of selected countries. The report revealed that damages associated with small scale localised disaster



events (Extensive risks events) are predominantly due to hydro-meteorological hazards and it accounts for significant % of total housing damages and people affected while compared to high impact disaster events (Intensive risks). This finding highlights the vulnerability of housing and built environment not just to major disaster events but also small scale localized events which does not receive attention and much needed support.

Above disaster damage and losses to housing sector show one side of the coin, on the flip side governments are increasingly concerned about the risks posed by extreme weather events and climate change. Housing and other associated infrastructure have longer lifetime (typically 20 to 40+ years) and it will be increasingly exposed to future risks posed by extreme events and climate change. While different framework and approaches are being evolved, it is important to focus climate change and associated risks as part of developmental issue and address underlying risk factors (discussed below). The guideline underscores the need to mainstream disaster risks posed by current and future climate risks as part of housing development and up-gradation or redevelopment process.

Understanding typical vulnerabilities contributing to housing damage from disasters

While a hazard in nature does not constitute disaster risk, underlying vulnerabilities to hazards and external drivers are ingredients for constructing disaster risk and resulting losses. *Box 3* lists some of the most common factors that contribute to vulnerability of building stock. While this list is generic in nature however it's valid for developing countries in Asia- Pacific region.

Box 3. Factors contributing to vulnerability of building stock

- Poor land use planning /with poor understanding on hazards / without risk based planning
- Lack of knowledge and incorporation of appropriate disaster resistant features during planning and construction process
- Lack of regulatory mechanism to enforce land use / building regulations
- Limited / no mechanism for accountability in case of violation of regulations
- Lack of skilled human resources in planning and execution
- Poor quality and sub-standard building materials
- Poor maintenance of structures
- Poor governance – corruption



A closer look at the above reveals a variety of factors, which contributes to the vulnerability of the housing stock. This ranges from having systems in place for proper settlement planning, appropriate technical guidance in forms of building codes, suitable enforcement mechanisms, capacity for implementation, and skilled labour as well as enabling factors such as good governance.

Box 4. Vulnerability of housing sector to Climate Change and associated risks

While impacts of climate change are already being felt in many parts of the world, scientific studies project that climate change will alter climate regimes, increase the intensity and frequency of extreme weather events and raising sea level. In 2010, the World Meteorological Organization's (WMO) Expert Team on Climate Change Impacts on Tropical Cyclones concluded that, if twenty-first century warming occurs as projected, there will likely be an increase, on average worldwide, in the maximum wind speed of tropical cyclones of +2 to +11 % and in rainfall rates of approximately 20% within 100 km of the storm centre.

Though above scenarios may be of long term, but its certain that damages will be of higher degree if vulnerabilities to current and future risks are not addressed in an integrated manner. Particularly it will be of challenge while addressing the risks associated Low Elevated Coastal Zones and Low Lying Islands due to their increased exposure to storms and sea level rise.

Each of above factors would form the base for identifying approaches for mainstreaming DRR into Housing sector, as described in the subsequent chapter.

Understanding the process of development in housing sector

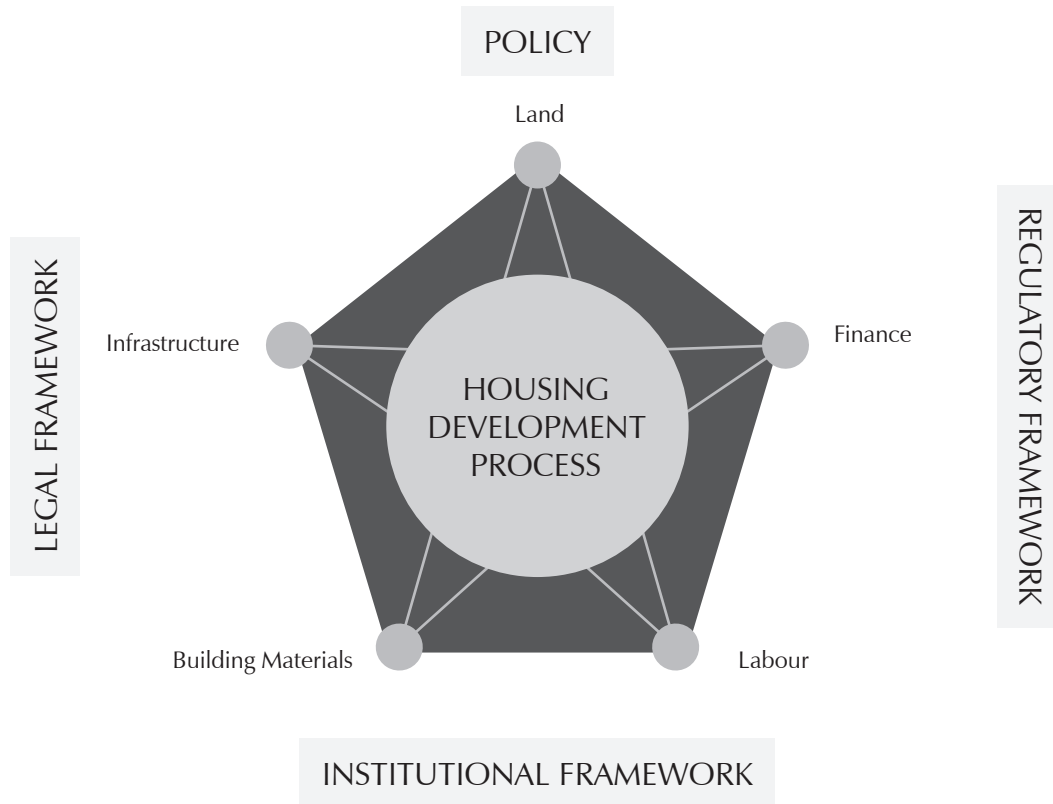
While it is essential to understand the underlying factors contributing to risk (discussed above), it is equally important to understand the processes of typical development in the housing sector, since this would allow one to understand the interface between the two and thus identify entry points of mainstreaming DRR into development processes of housing sector.

Housing development process is multi-sectoral and to an extent complex in nature, as it involves different actors at different levels. While developing an housing scheme or programme, government takes into account of various factors such as needs assessment, target group, housing finance, location, design including size and density, technology, operation and maintenance and the nature of home-ownership or rental purpose. Figure 1 illustrate a typical housing development processes in any country (UN Habitat, 2010). Availability



of land, adequate finance, skilled labour, appropriate building materials, reliable infrastructure, are critical components for housing development process and they have significant bearing on the outcome.

Figure 1. A typical development process of housing (UN Habitat, 2010)



In addition to their interaction within the components, they are in turn shaped by policies, legal, regulatory and institutional frameworks in the country which provides an enabling environment for housing development process. Notably, National Housing Development Policy is a key document spelt out by the Government in order to support housing related services, while legal framework such as National Housing Act, Town and Country Planning Act, Housing Finance Act provides legal basis to support housing development and regulatory framework such as National Building Code, Development Control Rules, Coastal Zone Regulations, Environmental Regulations, ensure safety and quality standards of structures and environment. Institutional framework provides the backbone for implementation of housing policy and ensures all the relevant legal and regulatory aspects are enforced. Good governance as part of institutional framework is a determinant for success of the housing development and disaster risk reduction.





What does it mean to mainstream DRR in housing sector?

Irrespective of the nature of hazards, disaster losses associated with housing sector are due to underlying risk factors and the subsequent sections discuss the rationale and entry points for mainstreaming disaster risk reduction into the housing sector.

Box 5. Definition of Mainstreaming DRR

- Is to consider and address risks emanating from natural hazards in:
 - medium-term strategic frameworks,
 - institutional structures,
 - country and sectoral strategies and policies and
 - in the design of individual projects in hazard-prone countries.
- Requires analysis of how potential hazard events could affect the performance of policies, programmes and projects and of the impact of those policies, programmes and projects, in turn, on vulnerability to natural hazards.
- Above analysis should lead on to the adoption of related measures to reduce vulnerability, where necessary, treating risk reduction as an integral part of the development process rather than as an end in itself.

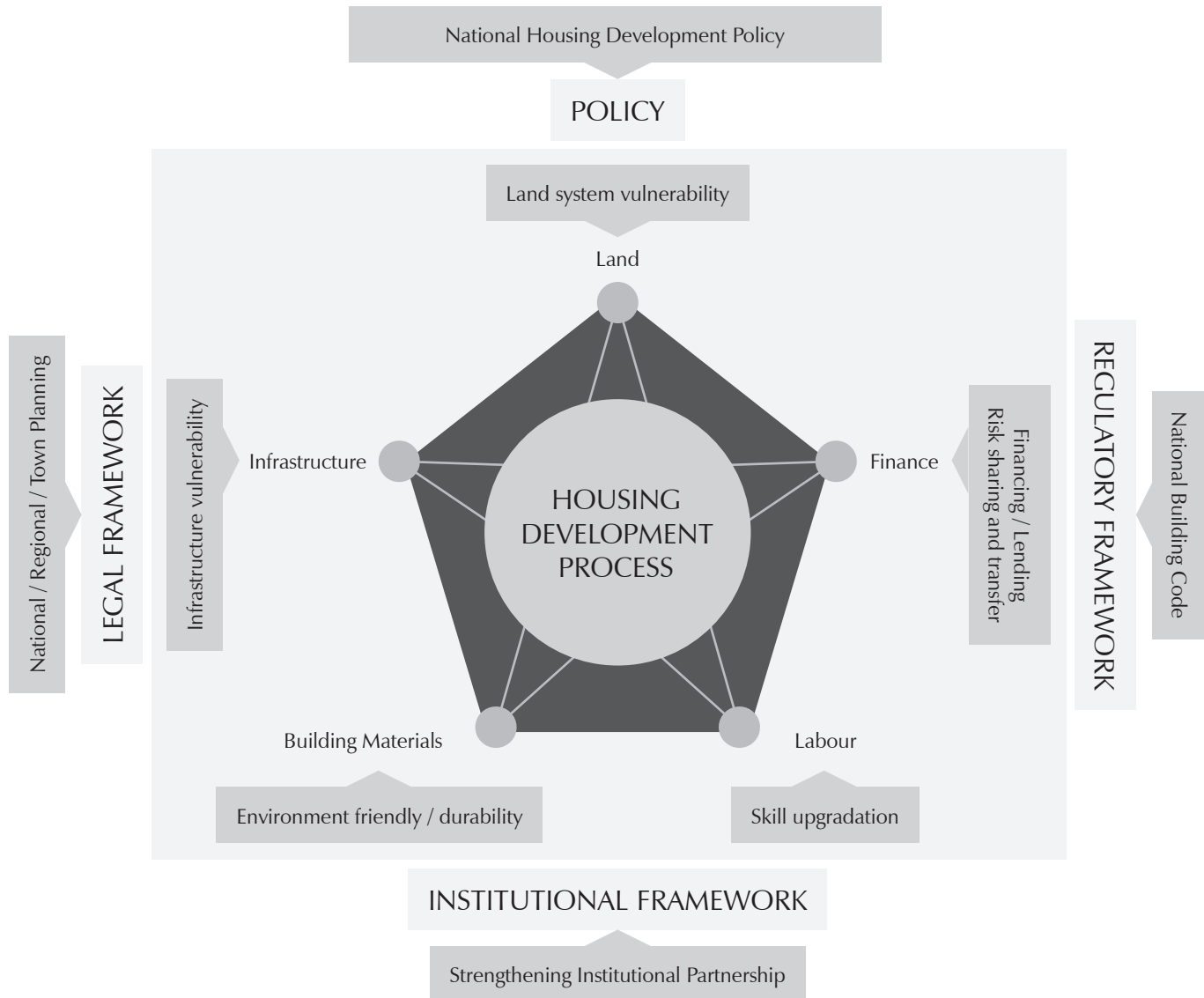
Source: Tools for mainstreaming DRR: Guidance notes for development organisations, Provention Consortium

With this understanding, Mainstreaming DRR in housing would mean that all housing related interventions have considered the effect of natural hazards (current as well as future risks magnified by climate change) and of the impact of those interventions in turn, on vulnerability to natural hazards, and accordingly have adopted risk reduction measures. This would require understanding the typical vulnerabilities to hazards, analyse how these vulnerabilities interact with the existing processes of development of the sector and understanding of the actors involved in each of the processes.

At a strategic level mainstreaming entails addressing/incorporating DRR measures in policies, regulations while at operational level undertaking specific measures such as evaluation of hazards, vulnerability and risks and addressing it through appropriate mitigation measures. Incorporation of DRR measures and cost depends on the vulnerability factors for e.g., land use planning can either reduce or increase disaster risk by allocating appropriate land for development, however there might be additional cost involved with the choice of land development and during the structural design stage it depends on the particular performance



Figure 2. A typical process of housing development and possible entry points and enabling environment to mainstream DRR



objective of the structure and the disaster resistant feature considered. In case of housing it would be important to design the structure to a minimum service level of operational or of higher order to life safety performance level.

Figure 2 shows the possible entry points (into housing components) and enabling environment (frameworks) for DRR interventions in the housing development process which can results in varying degree of impact. Mainstreaming efforts aiming at frameworks will benefit long-term housing delivery process; small steps within a shorter timeframe can also be made for immediate advancement by addressing the specific components on a case by case basis such as during new housing / reconstruction programme and replicate or upscale the process.

In addition it should be noted that, mainstreaming is not done as an isolated effort, each entry point interacts with the others framework / components which support the process. As indicated above various actors are involved directly and indirectly in housing development process Table 3 lists out the different agencies at national and local levels that could collaborate for efficient mainstreaming of DRR in housing. However any effort to mainstream DRR has to focus at long term process for successful integration and outcome.

Table 3. Actors involved in broader housing development process

DRR in enabling environment	Agencies involved
Policy framework recognising importance of DRR	Ministry of Planning, Ministry of Housing Ministry of Urban Development, Ministry of Rural Development / Social Works (Rural Housing) Ministry of Finance, National / State Housing Agencies Housing Finance Institutions National Disaster Management Organisation Local Government Institution
Legal framework inbuilt with appropriate DRR measures	Ministry of Land/Land-use Planning Ministry of Urban Development Ministry of Housing Technical institutions related to Coastal/Flood/Seismic/Landslide hazards National Disaster Management Organisation
Regulatory systems with adequate safeguards for DRR	Ministry of Land/Land-use Planning Ministry of Housing Technical institutions related to Coastal/Flood/Seismic/Landslide hazards Housing Authorities Local Government Institutions National Disaster Management Organisation
Institutional systems with adequate capacity with to support DRR	Ministry of Housing Ministry of Urban Development Ministry of Rural Development Housing Finance Institutions Technical Institutions related to Coastal/Flood/Seismic/Landslide hazards Public Works Department National/State Housing Agencies Local Government / Municipalities National Disaster Management Organisation



Box 6. Building back better: Mainstreaming DRR in housing recovery

Aftermath of any major disaster housing recovery strategies is one of the challenging tasks as there is lot of uncertainty on how the reconstruction program will be undertaken. At the policy level it utmost important for mainstreaming DRR in the reconstruction strategies to enable safe built environment and build back better. Housing reconstruction is a unique challenge and provides a window of opportunity to reduce underlying risks factors and build back better. Mainstreaming can be undertaken by enhancing safety standards, review of regulatory and planning framework such as land- use and by incorporating disaster risk reduction. However experience has shown it's easy to say than done.

Building back better is necessary, but it is not enough.

“While Ondoy’s flooding could not have been prevented, its extensive impact was preventable. Similarly, the damage wrought by Pepeng could have been mitigated. Preventing such impacts in the future requires attention to the governance of Filipino development in areas such as land use planning, housing, water management, environmental protection, and disaster risk mitigation. Indeed, the factors that resulted in the impacts from Ondoy and Pepeng are among the same factors that lie behind a number of major development challenges...”

(Source: Typhoons Ondoy and Pepeng: Post-disaster needs assessment).

Following section on approaches in mainstreaming discusses about the entry points in the framework / components individually with cross linkages for clarity purpose.



SECTION 3

Approaches to mainstream DRR into housing

This section of the Guideline provides approaches that could be adopted both in long as well as short term to mainstream DRR in the housing sector. This includes entry points into the housing components which support housing development process and also the frameworks which shape these components as an enabling environment for mainstreaming DRR. While the each of the framework and components are interlinked the guideline focuses on individual elements with cross linkages and present entry points for mainstreaming DRR with case studies from the region.

- Frameworks that shapes housing development as an enabling environment
 - Institutional Framework
 - Policy Framework
 - Legal Framework
 - Regulatory Framework
- Housing Components supporting housing development as entry points
 - Land
 - Housing finance
 - Labour
 - Building Materials
 - Infrastructure

Keeping in view of regional diversity, actual entry points would vary depending on country's existing legal and institutional systems, priorities, need, opportunities and resources available. The topic of good governance, being one of the main determinants in integrating DRR in the housing sector, has been touched upon and covered through all the approaches. This section is for *policy makers, planners, national/local agencies, project managers, donors and other development agencies.*

Housing Development Framework to act as Enabling Environment for Mainstreaming DRR

This section of the report focuses on institutional, policy, legal and regulatory framework which shapes the housing development process. As mentioned above frameworks have close interaction with the housing components (land, finance, labour, building materials and infrastructure) and provides an enabling environment for mainstreaming DRR.

Institutional Framework

Government through its National Housing and associated agencies plays an important role as a provider and enabler for development of housing in a country. National housing agencies are the core agencies where the mainstreaming of DRR can be initiated, sustained. In order to provide an enabling environment for mainstreaming DRR, it is important for the housing agencies to reassess their role to reduce disaster risk and if it is not adequate, evolve / strengthen mechanisms within the existing system. Questionnaire in *Table 4* helps in assessing the level of competency of the national housing agency in handling DRR. Though the questionnaire is not exhaustive it broadly raises the issue at operational and programme level which will enable mainstreaming. Based on the outcomes of the assessments, housing organisations can take necessary measures to strengthen / evolve mechanisms to reduce disaster risks within the existing system.

Further, housing as a multidimensional aspects necessitate close collaboration with various actors involved in sectors ranging from social, physical, economics, financial, environmental as well as livelihood aspects. It is important that all stakeholders are part of the process of mainstreaming including financial institutions, national and local agencies involved in DRR and housing, the municipalities, donors and the beneficiaries.

Table 4. Premise to assess whether housing development organisations are equipped to deal with DRR

		Yes	Partially	No
Organisational / programmatic framework	Does the organisation consider natural hazards as an impediment to provide adequate safe housing?			
	Does your organisation carry out estimation of annual disaster losses related to its investments and project activities (direct and indirect losses)?			

	Yes	Partially	No
Organisational / programmatic framework			
Does your organisation policy or strategy consider DRR measures to reduce damage and losses?			
Does your organisation collaborate with relevant stakeholders (refer Table 4) to address the specific vulnerabilities to reduce disaster risk?			
Is DRR integrated in project planning, implementation and evaluation as standard procedure? And take steps to amend the housing development process incorporating disaster risk reduction measures?			
- Land: Does the project/ programme activities take into account of current and future risks for a project area?			
- Finance: Does the organisation have additional financial mechanism to support mainstreaming of DRR through insurance and risk transfer mechanisms?			
- Labour: Are there human resources available to support DRR in housing project planning and implementation, and monitor it?			
- Building Materials: Does your organisation promotes and uses locally, environmentally friendly, durable building materials?			
- Infrastructure: Are the infrastructure facilities designed for resiliency?			

Policy Framework : National Housing Policy

The Habitat Agenda identified the right to adequate housing that is safe, secure, healthy, accessible and affordable as most crucial. In line with this, most countries have framed their National Housing Policy setting out the broad goals and objectives for housing and providing a framework for addressing housing issues through an enabling policy framework.

While in some cases housing development policy does not explicitly address disasters, policies often outline the need to provide safe housing, indicating safe from natural and man-made disasters. However more specific approach is required to address disaster risks. Aftermath of 2005 Kashmir earthquake, the Ministry of Housing and Works, Pakistan has recognised the importance of mainstreaming DRR in the housing strategy. In 2010, the Ministry With the

support from NDMA, UNDP, and professional bodies have embarked upon development of “DRR Sensitive Housing Policy and Planning Standards” and currently the housing policy is being finalised. Similarly, the draft National Housing Policy of Sri Lanka (2011) focuses on DRR and it pays special attention to housing reconstruction. *Table 5* helps to re-assess the integration of DRR in the housing policy.

Table 5 Premise to assess existing policy in the country:

	Yes	Partially	No
Does the national housing policy identify the impacts on housing from natural hazards as one of the factors affecting the safety and delivery of houses?			
Does the policy explicitly address environmental and natural disaster concerns through the housing components?			
- Land: : Does the policy recognise the need to promote the settlement in safe areas based on land use planning?			
- Finance: Does the policy encourage the use of insurance, risk transfer and appropriate risk sharing mechanisms?			
- Labour: Does the policy address the needs for human resource development to support improving skills of Engineers, Architects and Masons etc including disaster mitigation?			
- Building Materials: Does the policy encourage adaption of appropriate technological advances in building materials and techniques to reduce risk?			
- Infrastructure: Does the policy promote the need for provision of resilient Infrastructure facilities?			
Does the housing policy provide necessary guidance for post disaster housing reconstruction?			

Box 7 presents the extent to which DRR has been incorporated in the Indian National Urban Housing and Habitat Policy – 2007 and Draft National Housing and Rural Habitat Policy. Notably the Housing and Habitat Policy-2007, recognises the importance of DRR measures and in relation to housing components.

Box 7. Case Example: National Urban Housing and Habitat Policy- 2007,
Ministry of Housing & Urban Poverty Alleviation, Govt. of India

Government of India enacted its updated National Urban Housing and Habitat policy in 2007 with an goal of “Affordable Housing For All”. The policy lays special emphasis on vulnerable sections of society and provision of housing for Economically Weaker Sections (EWS) and Low Income Groups (LIG). Relevant excerpts pertaining to disaster risk reduction in the policy is presented below.

- **Promote appropriate ecological standards for protecting a healthy environment** and providing a better quality of life in human settlements. Special attention will be paid to housing in coastal areas in order to promote fragile ecology. Further, adequate mangrove and allied plantations will be promoted in coastal areas especially those which are in high disaster-prone zones to avoid loss to life from natural disaster.
- Water bodies will be protected with special emphasis on keeping the flood plains of tropical rivers free from construction or encroachments.
- Efforts will be made to encourage States/UTs to develop **Sub-regional / Special Area Development Plans for areas with fragile ecological characteristics on the basis of Environment Impact Assessment (EIA)** so as to take care of all environmental concerns at the planning stage itself in consultation with the Ministry of Environment & Forests.
- Promote the **observance of the National Building Code (NBC), 2005.**
- **Enforcement of the Building Code/ Building Guidelines relating to disaster resistant planning and technologies will be taken up and specific elements in different disaster prone zones will be made compulsory.**
- Develop **financial products** which encourage EWS and LIG housing beneficiaries to take insurance cover.
- Facilitate **training and skill upgradation** of construction workers.
- Research and Development organisations to i) Undertake research to respond to different climatic conditions with a focus on transition from conventional to innovative, **cost effective and environment friendly technologies** and ii) Develop and promote standards in building components, materials and construction methods including disaster mitigation techniques.

Draft Rural Housing and Habitat Policy has been formulated to specifically address the specific concerns of the rural areas as the National Urban Housing and Habitat policy 2007 address the needs of urban areas.

- To promote adequate flow of grant from Government to support housing for the poorest and the vulnerable.
- To promote larger flow of funds from Governmental and private sources for fulfilling housing and infrastructure needs by designing innovative financial products, concessions and instruments which are correctly targeted and utilized and to also facilitate access to such funds.

- To address the special needs of marginal and weaker sections of the society such as Scheduled Castes, Scheduled Tribes, other backward classes, minorities, disabled, women-headed households, single women etc., in relation to housing serviced by basic amenities.
- To **develop planned rural habitats with an assembly of basic services and livelihood infrastructure** that provide for dignified living and that promote healthy environment in a sustainable manner.
- To develop, promote and **transfer use of appropriate, environment-friendly, energy-efficient and disaster-resistant technology.**
- To develop required **technical and managerial capacity of delivery agents including upgradation of construction skills.**

Source: http://www.nhb.org.in/Rural_Hosing/Draft_RHP.php

Regulatory Framework: National Building codes and enforcement

The Building Codes are national instruments providing guidelines for regulating the building construction activities across the country. It serves as a model code for adoption by all agencies involved in building construction works including Public Works Departments, other government construction departments, local bodies or private construction agencies. In general, the Code mainly contains administrative regulations, development control rules and general building requirements; structural design and construction (including safety); fire safety requirements; stipulations regarding materials and other services.

DRR measures needs to be defined precisely and consistently in the existing building codes. The building codes are expected to have DRR integrated in respected to disaster resilient construction techniques; appropriate project planning for reducing risks and monitoring of process of mainstreaming DRR. These may require sufficient information and resources to include and modify the existing codes, the working organisational building code. The following *Table 6* helps to re-assess the integration of DRR in building codes and during enforcement.

Table 6. Premise to assess whether existing building codes DRR:

	Yes	Partially	No
Does the scope of the Building Code takes into consideration that the country lies in the hazard-prone area?			
Has there been regular review of Building codes in the country to incorporate DRR and other features?			
Do the sections on structural design and construction practices cover DRR measures?			



Are building code compliance a mandatory requirement during the approval process?			
Does the compliance requirement require Architects and Engineers approval?			
Does the code adequately address the quality control and structural safety requirements for the completion certification?			

While most countries in the region have National Building Codes while some does not have a comprehensive building codes and standards. Most often, DRR are promoted after the disaster and not supported by legislation on building codes. As a result, compliance becomes voluntary. Having them institutionalised becomes mandatory for all infrastructural development and therefore more effective in the long run. Given the situation, countries follow building standards of other countries. Bhutan offers a good example on how DRR measures can be enforced considering its high exposure to earthquake risks (Box 8).

Box 8. Building code and its enforcement in Bhutan:

Bhutan does not have standard codes for earthquakes, it draws upon the codal provisions of Indian Standards. Since 1997, Government of Bhutan made the relevant seismic codes mandatory. Bhutan Building Rules 2002, has section on fire safety (7.8), structural design of buildings need to conform to structural code for seismic design (9) and refers to Indian Standards IS 1893 - 1984: Criteria for earthquake resistant design of structures, IS 875 –1987: Code of practice for Design loads (other than earthquake), IS 4326 – Earthquake resistant design & construction of building. All the new buildings need to be designed by an Engineer and comply with the Bhutan Building Rules during the approval process.

The planning and design of housing are required to go through a number of approval stages. It begins with planning approval at national as well as local level, adherence to zoning and land-use approval, approval for the design (architectural, structural, electrical, sewerage and drainage to comply with the local rules) at the local level. The criteria for approval varies from municipality to municipality, every city, level of government and from country to country. It is at this stage that all housing programmes could be scrutinised and rectified before the main implementation. During the course of implementation enforcement will be a key indicator to determine the quality and the extent of mainstreaming of DRR has been implemented.



Legal Framework

Legal framework supporting housing development exist in form of National Urban Development and Housing Development Act, Town and Country Planning Act, Physical Planning Act, Land Act, National Housing Bank Act addressing rational use of land including for housing development, financial mechanisms, tenure system and mechanism for housing development, etc. In the case of the Philippines, Urban Development and Housing Act of 1992 (Republic Act 7279) promotes provision of decent shelter for underprivileged in the urban areas, rational use of land, land tenure system. The law does not provide adequate regulations for risk reduction and mitigation.

Entry points for mainstreaming DRR can be done either through the existing framework on housing such as amendments and / or through appropriate provisions in Disaster Management Acts. *Table 7* helps to assess the level of integration of DRR in legal frameworks.

In recent years many countries in the region have enacted comprehensive Disaster Management Act in order to support disaster risk reduction in a holistic manner. The DM act also provides an enabling environment to support mainstreaming DRR. *Box 9* presents the initiative taken by Government of India to amend the existing legal framework and the Philippines Disaster Risk Reduction and Management Act (Republic Act 10121) which promotes mainstreaming DRR and Climate Change in development process.

Table 7. Level of integration of DRR in legal frameworks

	Yes	Partially	No
Does the Town and Country Planning Act / Land use Zoning / Development Control Rules take into account of natural hazards?			
Does the Disaster Management Act encompass proactive DRR measures?			
Does the planning regulation restrict development in high risk prone areas?			
Does the regulation supports quality control of building materials ?			
Does the regulation stipulates safety measures for infrastructure ?			
Does the regulation promotes or requires mandatory risk transfer and sharing mechanisms?			

**Box 9. Proposed Amendment in Town and Country Planning Legislations:
India**

Ministry of Home Affairs, Government of India, constituted an expert committee to develop Model Building Bye-Laws and the Review of City, Town and Country Planning Act and the Zoning Regulations in January 2004. The expert committee was organised into two Sub-Committees 1) sub-committee on Town and Country Planning Act and Zoning Regulations and 2) sub-Committee for looking into Development Control Rules and Building Bye-laws. The expert committee provided a comprehensive report in July 2004 and based on the report, State governments were requested to constitute a committee to review and amend the process. Most states have reviewed and modified their laws while some have enacted the new legislations.

The committee report provides a detailed entry points on mainstreaming DRR in the legal framework. Reports can be accessed at <http://www.ndmindia.nic.in/>.

Philippines Disaster Risk Reduction and Management Act (Republic Act 10121)

The Republic Act 10121, provides an enabling environment to mainstream DRR into housing sector. Relevant excerpts related to mainstreaming DRR is provided below.

- Uphold the people's constitutional rights to life and property by addressing the root causes of vulnerabilities to disasters, strengthening the country's institutional capacity for disaster risk reduction and management and building the resilience of local communities to disasters including climate change impacts.
- Incorporate internationally accepted principles of disaster risk management in the creation and implementation of national, regional and local sustainable development and poverty reduction strategies, policies, plans and budgets;
- Adopt a disaster risk reduction and management approach that is holistic, comprehensive, integrated and proactive in lessening the socioeconomic and environmental impacts of disasters including climate change and promote the involvement and participation of all sectors and all stakeholders concerned at all levels especially the local community;
- Adopt and implement a coherent, comprehensive integrated, efficient and responsive disaster risk reduction program incorporated in the development plan at various levels of government adhering to the principles of good governance such as transparency and accountability within the context of poverty alleviation and environmental protection.
- Mainstream disaster risk reduction and climate change in development processes such as policy formulation, socioeconomic development planning, budgeting and governance, particularly in the areas of environment, agriculture, water, energy, health, education, poverty reduction, land-use and urban planning, and public infrastructure and housing, among others.

Components supporting Housing Development to act as Entry Points for Mainstreaming DRR

While above section focused on the frameworks which provides an enabling environment for mainstreaming DRR, following section focuses on specific DRR entry points in components related to housing development which are in turn shaped by the enabling environment.

Land

Land use planning is prepared to identify, adopt the best land use options for housing and also to identify alternatives. While good land use and planning can either eliminate disaster risk or minimize disaster risk by adapting appropriate mitigation measures it also reduces overall land vulnerability to disaster risks. Risk based land use planning can be an effective tool for managing disaster risks and protect development gains.

In India, Vulnerability Atlas of India developed by the Building Materials and Technology Promotion Council (BMTPC) under the Ministry of Housing & Urban Poverty Alleviation, provides detailed information of vulnerable areas based on expected intensities. The Atlas provides State-wise hazards maps and district-wise damage risk tables for all States and Union Territories. The Atlas also guides the authorities to strengthen regulatory frameworks, building bye-laws, land-use plans and promotes disaster resistant design, construction and planning practices. In the Philippines, the National Economic and Development Authority (NEDA) with support from UNDP and European Commission Humanitarian Department has developed Guidelines for Mainstreaming Disaster Risk Reduction (DRR) in Sub-national Development and Land Use/Physical Planning to assist the local government units by adapting risk-based comprehensive land use plans.

Under the RCC program on mainstreaming DM, guideline on “Promoting Use of Disaster Risk Information in Land Use Planning” has been developed targeting Government officials (land use planners, physical planners, township planners, transportation planners, architects, engineers, economists, sociologists, sectoral planners, etc). *Box 10* below details the aim of the mainstreaming guideline.

Box 10. Regional Consultative Committee on Disaster Management (RCC) guidelines on “Promoting Use of Disaster Risk Information in Land use planning”.

The guideline aims to

- Improve understanding of the role of land use planning in disaster risk reduction
- Highlight the importance of incorporating disaster risk information in land use planning.
- Provide guidance on how to incorporate disaster risk information in land use planning
- Present examples from RCC Countries where initiatives have been undertaken to incorporate disaster risk in land use planning at different scale.
- Provide a base for interested RCC member countries to develop similar guidelines in their country context and use it for facilitating dialogue with external development partners on the need to incorporate disaster risk information in land use planning.

In Sri Lanka, Land Use Planning Guidelines for Urban & Natural Disaster Mitigation were approved by the Planning Committee of the Urban Development Authority (UDA), Ministry of Defence, in 2011. The guideline is intended to provide relevant guidance to urban and regional planners on urban structure planning at national and framework planning at regional levels as well as in urban development planning for every urban declared areas of the country to incorporate urban and natural disaster mitigation (*Box 11*).

Box 11. Land Use Planning Guideline for Urban & Natural Disaster Mitigation in Sri Lanka

Based on experience in Rathnapura Municipal Council (Sabaragamuwa Province of Sri Lanka), zoning categories are suggested for Urban Local Authorities (ULA's) prone to both floods and landslides, are provided below:

1. Low Flood Plain Areas (Annual Flood) and areas made inaccessible by such floods
 - Major- Wetland Conservation & Flood Detention Zone (Buildings to be phased out over 5-year period, with phased relocation to safe areas).
 - Minor-Special Mixed Residential Flood Prone Zone with buildings on stilts/columns and special arrangements for flood-free access (bridges/ridges) as a compromise.
2. High Flood Plain Area (minus Low Flood Plain Area) and areas made inaccessible by such floods
 - Major-Recreation & Flood Detention Zone (Building to be phased out as above but very limited buildings on stilts)
 - Minor-Special Mixed Residential Flood Prone Zone (as above)
 - Special (Short-term) SPOT ZONES e.g. Gem-Mining, Other temporary use.

3. Areas of Safe Slopes (except Flood Plains)

- High & Medium Density Use Zones (Mixed Residential, Commercial, Industrial, etc.)

4. Areas where Landslides not likely to occur (except Flood Plains)

- High & Medium Density Mixed Residential Zone

5. Modest Level of Landslide Hazard

- Low Density Primary Residential Zone (With special sub-division and building guidelines & conditions).

6. Landslides to be expected and Landslides occurred in the past

- Major - Forest Park Zone
- Minor - Urban Agricultural Zone

7. Inaccessible Slopes

- Forest Park Zone


Source: Planning Guidelines for Urban & Natural Disaster Mitigation were approved by the Planning Committee of the Urban Development Authority (UDA) 2011.

Finance

Housing finance is important factor which influence housing development. There are different models in which housing programmes are funded ex. Regular budget, Housing Banks, Housing Finance Companies, Commercial Banks, Non Banking financial institutions and donors. Most often housing finance is funded through financial institutions. Most cases these institutions have safety provisions during their appraisal process for ensuring the investments are safe by minimizing their susceptibility to natural hazards. However the appraisal process has not been adequate to make the investments safe and buildings resilient refer to Box 12 on Indian experience.

Box 12. National Disaster Management Guidelines: On Ensuring Disaster Resilient Construction of Buildings and Infrastructure financed through Banks and Other Lending Institutions, 2010

In India, Urban Local Bodies or Urban Development Authorities are mandated to enforce techno-legal regime related to various Acts, Bye-laws, Rules and Regulations. The guidelines notes that compliance to building codes in urban areas are weak and while there is no mechanism in place for rural areas and the compliance checking has to be carried out by financial institutions. In the context of disaster resilience, there are three critical gaps in the current practice of the provision of housing finance by banks and other lending institutions:

- 
- a. When an application is made to a bank seeking a housing loan to construct the building or structure, it is not necessary that it is designed in full. The architect and/or structural engineer provides a certificate that they will undertake the design (at a later stage);
 - b. Before the commencement of construction of the building or structure, the design of the whole structure is not furnished either to the local authority due to the lack of any definitive provisions in the prevailing local building bye-laws or to the banks financing the proposed construction [..]
 - c. The technical professionals (structural engineers and/or architects) advising the banks recommend that loan may be given to a project, without necessarily seeing the design of the complete structure, and sometimes simply based on his/her perception of the credentials of the architect and structural engineer of the proposed project.

The guidelines aims to improve the techno-financial regime for financing construction of houses and infrastructure by banks and other lending institutions in both urban and rural areas and mainstream DRR through financial systems. Based on the guidelines the Reserve Bank of India has issued circular advising lending instructions to adapt and follow the guidelines.

In addition, penetration of insurance, risk transfer / transfer mechanism is very low in the region and as a last resort government absorbs the cost associated. In Bhutan, Rural House Insurance scheme of Royal Insurance Corporation of Bhutan (RICB) provides mandatory cover for permanent and semi-permanent houses to Fire, Earthquake, Flood, Landslide, and Storm at a subsidized premium. RICB maintains and disburses the claims and if the claim amount exceeds the limits the government has to pay the excess. While it is a unique social insurance scheme, RICB's annual payout has always exceeded the annual premium. Joint Rapid Assessment of 2009, Bhutan Earthquake has called for strengthening the insurance program and linking its coverage to mitigation measures.

Labour

Labour in housing sector includes both formal and informal sectors. Non availability of skilled work force leads to poor design and construction of houses and infrastructure. Lessons from past disaster events, points to factors such as faulty design, weak construction material and poor maintenance, non-compliance to safety regulations. Formal sector holds prospects for improving the skills to ensure the quality and incorporation of disaster resistant design through relevant trainings and capacity building.

From a DRR perspective, technological advances are made to improve the disaster resistant features and subsequent enactments through building codes, however adaption of the improvements in practice are limited. Recent focus has been to incorporate relevant elements into the university curriculum so that university graduates have relevant skill and knowledge related to disaster resistant design. One of the key gaps in the labour market is that there are

limited opportunities for practising Engineers, Architects to upgrade the skill. In a post disaster reconstruction setting non-availability of skilled work force is a major impediment in providing safe houses.

Recognising the needs to improve the skills, measures are being taken at various levels in improving the skill sets of Engineers, Architects and Masons etc. While there are various short term training courses to build the capacity, In India, the Ministry of Home Affairs, implemented a National wide program to train Engineers, Architects and Masons in Earthquake Resistant Design through a network of universities and institutions to upgrade their skills (Box 13).

Box 13. National Programme for Capacity Building of Engineers and Architects in Earthquake Risk Mitigation

The Ministry of Home Affairs, Government of India, implemented a National Programme for Capacity Building of Engineers in Earthquake Risk Management (NPCBEERM) and National Programme for Capacity Building of Architect in Earthquake Risk Management (NPCBAERM) with an overarching aim of sustainable earthquake risk reduction in the country.

The program targeted to train 10,000 engineers and 10,000 architects in the States in seismically safe building designs and related techno-legal requirements. The programme was designed to deliver the training through network of 10 National Resource Institutes (NRI) through a standard curriculum and followed by trainers identified from the leading Engineering Colleges from each State, which will act as State Resource Institutes (SRI) for the State. Further the SRIs will train Engineers drawn from Municipal bodies, PWD as well as from the private sector in building bylaws / BIS codes and seismic safe constructions.

Likewise a National Programme was implemented to train masons in consultation with Housing and Urban Development Corporation (HUDCO) and the Ministry of Rural Development.

Source: <http://nidm.gov.in/NPCBERM/home.asp>

Building Materials

In general, choice of building materials for housing depends on various factors such as type, budget, culture, climatic condition and labour to name a few. Particularly in the context of low cost housing building materials need to be cost effective, environmentally friendly. However in practice, use of substandard materials, design and shoddy construction, poor maintenance are key reasons for structural failure. It is important to select appropriate building materials with designing process in order to reduce the structural vulnerability.

Wherever possible it is advisable to promote available materials with standards and specifications with incorporation in building codes for adaption. In addition there is a need to strengthen existing building industries in terms of skills, technologies and production for them to provide quality and durable materials. Box 14 presents the initiative taken by Building Materials & Technology Promotion Council (BMTPC) in developing Environment friendly, Energy efficient, Cost effective composite materials/products for Low Cost Housing and appropriate technology with disaster resistant features for different states in India.

Box 14. Cost effective materials/products for Low Cost Housing and the choice of technology according to various hazard zones in India:

Building Materials & Technology Promotion Council (BMTPC) under the Ministry of Housing & Urban Poverty Alleviation promotes development, production, standardisation and large-scale application of cost-effective innovative building materials and construction technologies in housing and building sector. BMTPC has developed Environment friendly, Energy efficient, Cost effective composite materials/products for Low Cost Housing and the choice of technology according to various hazard zones in India.

<http://www.bmtpc.org/pick%20your%20technology/PICK%20INDEX.htm>

While various innovative materials have been developed, the industry is unable to widely use it in practice. This is due to non-listing of materials and techniques in standards and codes. BMTPC is actively engaging with stakeholders such as HUDCO, BIS and research institutions for standardisation and adaption of building materials.

<http://www.bmtpc.org/identified%20promoted%20by%20bmtpc/identified%20index.htm>

Infrastructure

Basic infrastructure and services such as electricity, water and sanitation, roads, waste disposal are key components of housing development and greatly contributes to living standards. In general, services provided by the local government authorities in developing countries are inadequate due to funding constrain and further the services are disrupted during any disaster events. At times, past infrastructure development itself creates or exacerbates vulnerability of the area. Hence it is important to design infrastructure systems to withstand disaster impacts and also ensure that infrastructure facilities support evacuation and emergency response functions.

While the provision of basic services and infrastructure supporting housing development is provided by concerned departments / ministries. In the recent years many initiatives have been taken to improve the infrastructure services through integrated approach and also support upgrading the existing

infrastructure. Programs such as Ban Mankong collective housing in Thailand (Box 15) offers some innovative examples on improving the infrastructure facilities supporting housing development while encouraging the local communities to identify and address the issues in their area.

Box 15. Baan Mankong Program, Thailand:

The Baan Mankong Program (Secure housing in Thai) initiated in 2003, aims to create land security for the urban poor in their existing settlements and by develop basic infrastructure and improved housing in those settlements. The government channels the resources through Community Organizations Development Institute (CODI) a public organisation under the Ministry of Social Development and Human Security to provide infrastructure subsidies and soft housing and land loans, directly to poor communities, which in turn plan, manage budget and carry out improvements to their housing, environment and basic services. The program is built around five Strategies namely i) Slum Upgrading, ii) Re-Blocking, iii) Land Sharing, iv, Reconstruction and v) Relocation. One of the highlight of the program is to encourage Communities are to take the lead role in solving problems and making decisions on key issues such as temporary shelters, rehabilitation plan and disaster prevention measures. As of January, 2011, the program has supported 858 projects in 277 cities covering 90,000 households in Thailand

Source: <http://www.codi.or.th/housing/TenYearsCODI.html>

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Regional Consultative Committee on Disaster Management (RCC) Members

Director General
Afghanistan National Disaster Management Agency
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Director
Crisis and Disaster Management Directorate
National Security Division
Prime Minister's Department
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National Disaster Management Agency
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National Disaster Management Directorate
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Director General
Department of Disaster Prevention and Mitigation,
Ministry of Interior
Kingdom of Thailand

Director
Department of Dike Management, Flood and Storm Control
Ministry of Agriculture and Rural Development
Socialist Republic of Viet Nam



RCC Secretariat
Asian Disaster Preparedness Center
979/66-70, 24th Floor, Paholyotin Road,
SM Tower, Samsen Nai, Phayathai,
Bangkok 10400, Thailand
Tel: +66 2 298 0681 to 92
Fax: +66 2 298 0012 to 13
Email: adpc@adpc.net
URL: www.adpc.net
RCC Website: www.rccdm.net