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Urban Resilience and Adaptation for India and Mongolia

Curricula, capacity, ICT and stakeholder collaboration to support green & blue
infrastructure and nature-based solution

Report on:

Lecture Material

Development Control Regulation-Introduction

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Partner number: P12

Nirma University, Gujarat, India

Disclaimer

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Course Name: Laws, Policies and Guidelines promoting Green and Blue Infrastructure

Number of credits: 2 ECTS

Period: **Fall/spring** semester

Coordinator	Prof. Vibha Gajjar
Credits	2 ECT
Lecturers	Prof. Vibha Gajjar and Prof. Utpal Sharma
Level	Online course open for all
Host institution	Nirma University
Course duration	14 Days

Summary

This is a 2 ECTS online course which will be open to all students or professionals from various departments like architecture, planning, design, engineering, etc. This course will introduce various laws and policies to encourage blue and green infrastructure in our built environment.

Target student audiences Open for all (online course)

Prerequisites NA

Aims and objectives

The main course objective is to

- Examine the role and function of several statutory authorities involved in a city's development.
- Examine the building bylaws and other restrictions that apply to the structures.

- Understand the roles of several regulatory bodies in urban development, as well as the normal procedures for building/scheme plan approval and whetting.
- Apply your understanding of the construction and plan approval procedures..

E Content for (Day 1)

- History of building bye-laws, regulations and need for development control guidelines (early post-industrial cities; safety, health and hygiene concerns)

Development Control Regulation????????



History of man's changing attitude towards his shelter, his means of livelihood & his leisure time.

Lecture by:
Prof. Vibha gajjar
Institute of Architecture and planning ,nirma University



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Building Regulation

Topics to be covered :

Overview of Subject

Need for Regulation

Difference between Act, Rules and Regulation

Purpose

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“ God made villages
 and men made cities
 and towns ”



Rural Areas: Major occupation
 Primary Sector

of Regulation, Prof. Vibha Gajjar

“ God made villages
 and men made cities
 and towns ”



Urban Areas: (Major occupation)
 • Secondary Sector
 • Tertiary Sector

Source: <https://www.hindustantimes.com/>

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Premise: Why study Building Regulations ?

Mode of construction varies from region to other regions depending upon motive of owners, availability of material, labour, construction, weather conditions, etc.



Laws and Regulations

What is Architecture:

1. It is the process and product of planning, designing & construction.
2. Style, method of design, construction of buildings & other physical structures.



What is Law:

1. It is system of rules and guidelines which are enforced to govern behaviour; made by the government; specifically by their legislature.
2. Law is important as it acts as a guideline as to what is accepted in society.
3. Without it there would be chaos and conflicts between social groups, society, construction, etc.



The document lays down the framework demarcating fundamental political code, structure, procedures, powers, and duties of government institutions and sets out fundamental rights, directive principles, and the duties of citizens.

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Laws and Regulations

- Laws go through the bill process before becoming established as a law.
- A regulation is created by a governmental agency, often to actually implement a given law, and does not have to go through the bill process

Regulations. n. **Rules** and administrative codes issued by governmental agencies at all levels, municipal, county, state and federal.

Although they are not **laws**, **regulations** have the force of **law**, since they are adopted under authority granted by statutes, and often include penalties for violations.

It's important to note that Regulations ARE NOT laws

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Acts and Regulations

- An **ACT** is legislation passed by the Parliament.

Acts, (not including Schedules to Acts) can only be amended by another Act of Parliament. Acts set out the broad legal/policy principles.

- **REGULATIONS, RULES, CODES** etc. are commonly known as "subsidiary legislation" and require publishing in the *Government Gazette* to become legal.

These are the guidelines that dictate how the provisions of the Act are applied. Regulations and schedules to Acts can only be amended by a notice published in the *Government Gazette*.

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Need for Building bye-laws

- Building bye-laws are created by the town planning authorities and address various building and safety requirements, apart from height, coverage, limitations and amenities in a building.



Source: <https://housing.com/news/building-bye-law/>

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Peep into the past

Our Ancient Building Rules.....

- Our elders not only laid down rules for the layout of villages, towns & cities
- but
- they have also laid down sensible codes for the construction of buildings.

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Building bye-laws' purpose

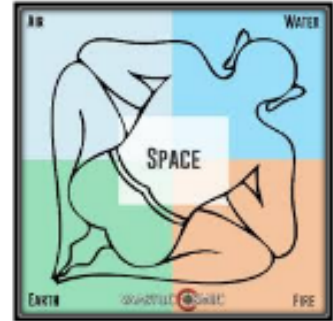
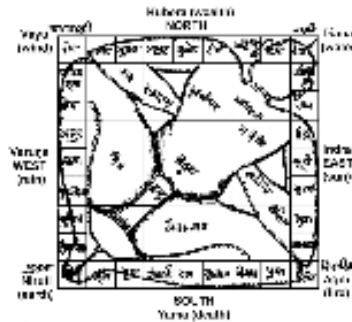
- Formulated primarily by a central authority, building bye-laws ensure that constructions are not only safe but also adhere to aesthetic standards.
- In that sense, these regulate the construction and the architectural aspects of construction activities.

(For example, the rules prescribed under the building bye-laws can make it mandatory for builders to keep fire safety and earthquake-resistance provisions at their projects.)

- Building bye-laws also govern the provisions for open spaces in a project, with the aim to ensure that developments do not turn the city into a concrete jungle.

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Peep into the Past:



At one time, ours was a civilized country and there was no limit to our spiritual daring in the realms of religion, philosophy and science. Her spiritual forces spread far, annexing new domains..she won the preceptors' seat and many nations of ancient World cordially welcomed her into their homes as a spiritual guide.

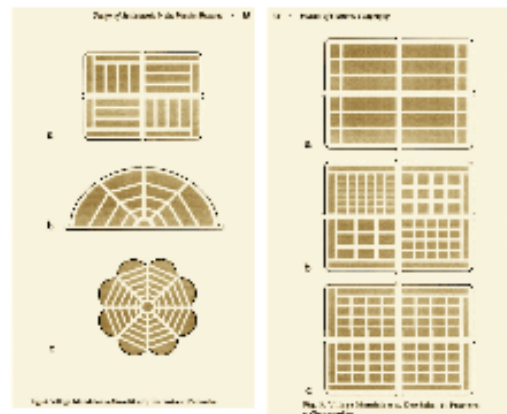
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Retrospection:
Science
Applied Science
Efficiency
Fear vs Hope

Peep into the Past:

Our Ancient Building Rules....

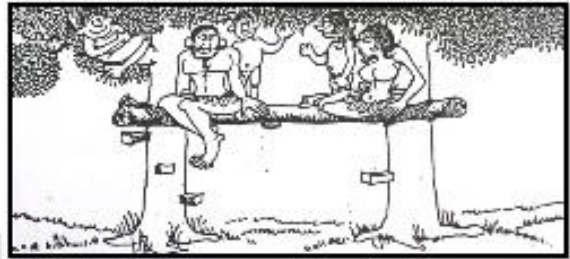
Our ancestors developed and practiced Town Planning as Art and Science. Various surviving works on Vastushastra ; (Manasara /Mayamata / Viswakarma Prakasika, etc.) are the proud legacies which were left behind and many of us are not aware of their existence.



* Patterns adopted by our ancient elders for their towns and cities.....

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Tools of planning remain
same as they were 1000 of
years ago.....



Purpose of planning has shifted
from military security , to aesthetic
expression, to public welfare.....

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Selected rules & codes according to Vastushastra ; (Manasara /Viswakarma Prakasika are:



First Layout the village, town or city, then plan and build the house.



King should allot sites necessary for all classes of men high, middle and low.

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Selected rules & codes according to Vastushastra :

1. The minimum land required for the class of men:



❑ Low class = 24'x48'.



❑ Middle class = 36'x72'.



❑ High class = 48'x 96'.

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Selected rules & codes according to Vastushastra :



Half of the extent of the site should not be built upon in any case.



Building to be erected after Tree plantation only.



The height of the buildings in the same street shall correspond.

Ancient Building code

- **Manasara Silpa Shastram** is a definitive Indian treatise on Vastu Sasthram, an ancient building code which was used for designing houses, planning cities and communities for centuries in India.
- This document was used as a prescriptive building code dealing with architecture and spatial organisation of residential quarters. It is written by a sage named Mansara. It is one of the 5 documents that exists now which deals with Vastu Sasthram.

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History of Building Codes-World

- The first known written building code -King Hammurabi in Babylon in 1758 B.C. (Literally written in stone, the harsh penalties of the code established that people who are designing and building for others are accountable for the quality of their work.)
- The Code consists of 282 laws.



Source:<https://aiacentralpa.org/architext-summer-2020/>

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Recent History

- **Scientific Revolution** –(replaced the Greek view of nature that had dominated **science** for almost 2,000 years.)
(fundamental transformation in scientific ideas across mathematics, physics, astronomy, and biology in institutions supporting scientific investigation 1543 – 1687)
- **Age of Enlightenment** – (a philosophical movement of the 18th century, characterized by belief in the power of human reason and by innovations in political, religious, and educational doctrine.)
(Intellectual and philosophical movement in 1715-1789)
- **Industrial Revolution-** (transition to new **manufacturing** processes)
(**three** advancements—the steam engine, the age of science and mass production, and the rise of digital technology 1760 to sometime between 1820 and 1840.

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Present Practice

National Building Code-India

- The National Building Code (NBC) is a standardized set of rules to be followed by authorities and construction firms, to provide a healthy and safe living experience for all residents
- The National Building Code (NBC) is a standardized set of rules to be followed by authorities and construction firms, to provide a healthy and safe living experience for all residents

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Reading material list:-

- Building a New Techno-Legal Regime for Safer India

<https://www.undp.org/india/publications/building-new-techno-legal-regime-safer-india>

- Model Building Byelaws

<https://mohua.gov.in/upload/uploadfiles/files/MBBL.pdf>

- Comprehensive Development plan

<https://ghhc-india.gov.in/Content/GUJ/CGDCR-2017-PART-I-PROCEDURE-REGULATIONS.pdf>

- Town planning and valuation department

<https://townplanning.gujarat.gov.in/>

<https://link.springer.com/article/10.1007/s10901-017-9552-7>

<https://www.sciencedirect.com/science/article/pii/S221260901400017X>

Building a New Techno-Legal Regime for Safer India



Ministry of Home Affairs
National Disaster Management Division
Government of India

bmtpc

Building Materials & Technology Promotion Council
Ministry of Urban Employment & Poverty Alleviation,
Government of India

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Prepared on the basis of recommendations of the Expert Committee constituted by Ministry of Home Affairs to Develop Model Building Bye-laws and the Review of City, Town and Country Planning Act and Zoning Regulations.

Disclaimer

The information compiled in this brief document may not be complete. Any information left out is not deliberate.

Constitution of the Expert Committee for Development of Model Building Bye-laws for Seismic Zones III, IV & V and the Review of City, Town and Country Planning Act and Zoning Regulations.

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PREFACE

Recent past earthquakes (Uttarkashi 1991, Latur 1993 and Bhuj 2001) have clearly exposed the vulnerability of our building stock, which caused wide spread damage resulting in loss of lives and property. This is mainly due to faulty design and construction practices which do not follow earthquake resistant features specified in Indian Standards and Building Codes.

To create an appropriate Techno-legal regime in the country and effective enforcement mechanism, the Ministry of Home Affairs, Government of India constituted an Expert Committee to develop Model Building Bye-laws and Review the existing Town and Country Planning Acts and develop Control Zoning Regulations/Building Bye-laws.

The Committee has submitted its final Report which contains detailed recommendations for modifications in existing Town and Country Planning Act, putting Landuse Zoning Regulation in place, and additions to Development Control Rules and Bye-laws. The Ministry of Home Affairs, has recommended the same to the State Governments and Union Territory Administrations for early adoption.

Recent Tsunami waves on East Coast have further strengthened the need to have proper land use zoning regulations and safer construction in coastal region.

A series of Workshops have been planned in all States and Union Territories to disseminate the recommendations of the Expert Committee and further follow up action for amending the legal framework including Development Control Regulations and Bye-laws for Safety against Natural Hazards. With all these actions and better enforcement there is road ahead for safer development and construction.

This publication provide the synopsis of the major recommendations given by the Expert Committee.

M.N.Mathur
Executive Director
BMTPC



Building a New Techno-Legal Regime for Safer India

1 INTRODUCTION

India is a large country and has had more than its share of major natural hazards like drought, floods, earthquakes and cyclones throughout its history of civilization. Naturally, the country developed its own practices and strategies for coping with the various natural calamities. Since independence in 1947, India has developed a nationwide relief administration where a lead role of the State governments is envisaged. The ten year period of the International Decade for Natural Disaster Reduction (IDNDR), therefore, came as a good opportunity for the country to look back at what had been done in the past, take new initiatives during the Decade, and plan ahead for reducing the impact of the natural hazards on its people, settlements and economic developments.

The Super Cyclone in Orissa in October 1999, Bhuj Earthquake in Gujarat in January 2001, and now the devastating Tsunami in East Coast and series of Earthquakes in Andaman & Nicobar Island on December 26, 2004, underscored the need to adopt a multi dimensional endeavor involving diverse scientific, engineering, financial and social processes, the need to adopt multi disciplinary and multi sectoral approach and incorporation of risk reduction in the developmental plans and strategy.

There has been a paradigm shift in the approach to disaster management in the country. The new approach proceeds from the conviction that development can not be sustainable unless disaster mitigation is built into the development process. The new policy also emanates from the belief that investment in mitigation are much more cost effective than expenditure on relief and rehabilitation.

Disaster management occupies an important place in the country's policy framework as it is the poor and the under-privileged who are worst affected on account of calamities/disasters.

The approach has been translated into a National Disaster framework covering institutional mechanism, disaster prevention strategy, early warning systems, disaster mitigation preparedness and response including human resource development.

Disaster prevention is defined to encompass activities designed to provide permanent protection from disasters; which will include engineering and other physical protective measures, and also legislative measures controlling land use and urban planning.

The goals of prevention is (a) to ensure that all new buildings are designed and constructed with proper engineering intervention taking due care for safety against natural hazards in urban as well as in rural areas so that no unsafe buildings are added to the huge existing stock of unsafe buildings; (b) to ensure upgrading the safety of buildings in the public sector by retrofitting techniques and encourage similar action regarding buildings in the private sector.

National standards/codes on disaster resistant structures including the National Building Code of the country are second to none in technical contents. However, to make their use mandatory, proper enabling provisions are required in the legal framework of the country.

Laws pertaining to planning, development and building construction are very important to achieve planned and safe development in urban and rural areas. Building standards/regulations are derived from various laws pertaining to planning and development of different states. They provide the mandatory techno-legal framework for regulating building activity from planning, design to completion of construction.

To make the techno-legal regime in the country sound enough to ensure safe construction, a

road map has already been drawn by the Government. This includes modification in the existing laws, development control rules, bye-laws.

The first step in this road map is preparation of Model Town and Country Planning Legislation, Zoning Regulations, Development Control, Building Regulations/Bye-laws. Action interactive with State Government through Workshops and further follow up action including capacity building exercise are the subsequent steps for ensuring adequate and effective techno-legal regime in the country.

2 THE TERRITORY OF INDIA

India covers an area of 32,87,263 sq.km extending from snow covered Himalayan heights in the North to the tropical rain forests of the South. In the North, the territory is bounded by the Great Himalayas and stretches southwards tapering off into the Indian ocean between the Bay of Bengal and the Arabian Sea. The main land extends between latitudes 8°4' and 37°6' North and longitudes 68°7' and 97°25' East, measuring about 3200 km from North to South and West to East. This vast land frontier of 15,200 km and coastline of 7,500 km also has groups of islands located both in the Bay of Bengal and the Arabian Sea. Hardly any other



country has such a large land mass with such a diverse range of geo-agro-climatic zones.

The main land of India comprises of four regions, namely, the Great Mountain Zone, Plains of the Indus, Ganges and the Brahmaputra; the Desert Region, and the Southern Peninsula. The Himalayan range comprises three almost parallel ranges interspersed with large plateaus and valleys. The mountain wall extends over a distance of 2,400 km with a varying width of 240 to 320 km. The plains about 2,400 km long, are formed by basins of three distinct river systems, viz., the Indus, the Ganges and the Brahmaputra. The desert region is clearly delineated in two parts - the Great Desert running beyond Rann of Kutch to Rajasthan - Sindh Frontier while the little desert extends between Jaisalmer and Jodhpur upto Punjab. The desert region is inhabited by local communities which have developed their own coping and recovery mechanisms. Between the two deserts is a zone of absolutely sterile region, consisting of rocky land cut up by limestone ridges.

According to 2001 census, India has a population of 1,027million (27.8% in urban and 72.2% in rural area) with 249.1 million housing units. 177.5 million in rural and 71.6 million in urban area. To protect such a large population with low levels of education from the fury of natural hazards is not an easy task. However, local initiatives and the government's efforts combined over the years, have tried to reduce risks and build community capacity to deal with emergencies.

The country is a Union of 29 States and 6 Union Territories. The Union Territories are subject to the direct rule-making powers of the National Parliament and the administrative control of the Union Government. The States have elected Legislatures and Governments, which are fully autonomous in relation to the sphere of activities entrusted to them under the Constitution. The States are further divided into Administrative Units called Districts totalling to 693 in the

country. By convention, relief and disaster management are State subjects, the Union Governments acting as facilitator. Now under the 73rd and 74th constitutional amendments, the Village Panchayat (rural local body) and the Nagarpalika (urban local body) have the powers to initiate preparedness, mitigation, recovery and rehabilitation initiatives. Thus India has a decentralised administrative framework for local and community based initiatives.

3 LEGAL SUPPORT FOR PLANNED DEVELOPMENT/GROWTH OF URBAN AND RURAL AREAS

Building Regulations/Bye-laws provide the mandatory techno-legal framework for regulating building activity from planning, design to completion of construction.

Mainly such laws are State Legislations as the State is competent to legislate and make laws on such subjects. However, where the Central Government is to legislate on such subjects and where Parliament is to make law in this behalf such legislations are applicable in the Union Territories and in the State such as Delhi, where land use are reserved subjects with Central Government. One such Central legislation is Delhi Development Act, 1957.

For other States, such Central laws are advisory and recommendatory in nature. Taking this legislation as Model, other State Governments formulate the rules and regulations with the help of local bodies, under the various legislations. After the approval, the concerned local bodies enforce these rules and regulations pertaining to development and building standards as building regulations/building bye-laws in their respective areas.



4 AUTHORITIES FOR CONTROLLING DEVELOPMENT

To regulate the growth of urban areas, the State Governments notify areas for planned growth under certain laws. These are notified under relevant Planning and Development Act.

State Governments formulate the rules and regulations with the help of the local bodies, under the various legislation. After the approval, the concerned local bodies enforce these rules and regulations pertaining to development and building standards as building regulation/building bye-laws in their respective areas.

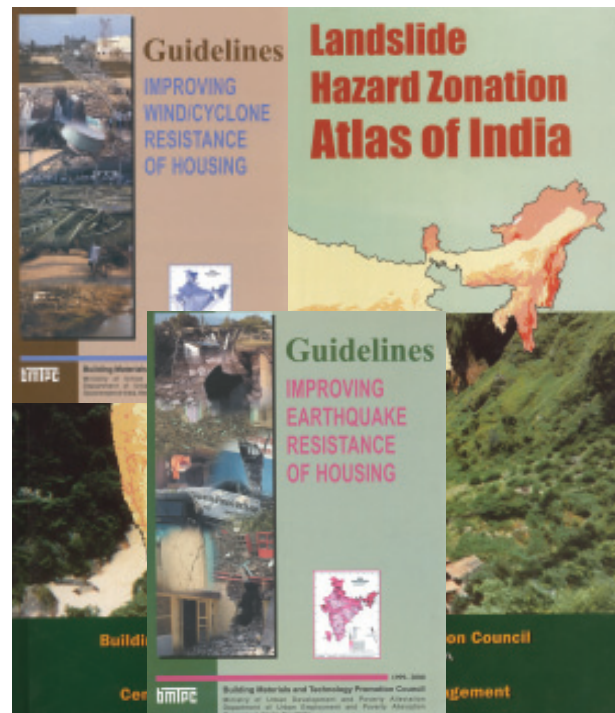
5 CENTRAL LEGISLATION/GUIDELINES

5.1 Model Town and Country Planning Act, 1960

The Town and Country Planning Organization (TCPO), which is an organisation of Central government to deal with the subject of planning (regional, urban and rural) and developmental policies, formulated a Model Town and Country Planning Act in the year 1960. The Model Act provides as follows:

- a. Provisions for preparation of comprehensive Master Plan for urban areas of various states. The states may adopt the Model legislation with suitable modifications for this purpose.
- b. To constitute a Board to advise and to coordinate in the matter of planning and plan formulation by the Local Planning Authorities in the State.
- c. Provisions for implementation and enforcement of the Master Plans and the miscellaneous provisions to achieve planned urban growth of various urban areas in the state.

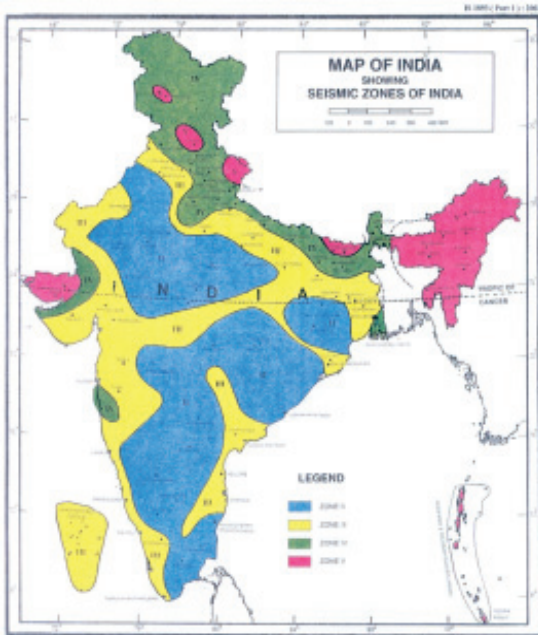
The above model was revised in 1985. The revised Model Regional and Town Planning and Development Law has largely been the basis



for the enactment of comprehensive urban and regional planning legislation in the States and UTs. This model is in the nature of a guideline and is the outcome of several reviews and revisions undertaken on the recommendations of the State Ministers Conference held from time to time. The legality of this model has been confirmed by the Ministry of Law.

With a view to ensuring better overseeing and coordination of planning with plan implementation, the Model Law which dealt with the planning aspect only has been reviewed and revised and now a combined planning and development law has been formulated in consultation with the concerned Central Government Ministries. Under this law, planning and plan implementation have been combined together so that a single agency could undertake both these functions. To do this, the planning and development authority to be constituted under the Law has been equipped with full planning and development powers to discharge this task.

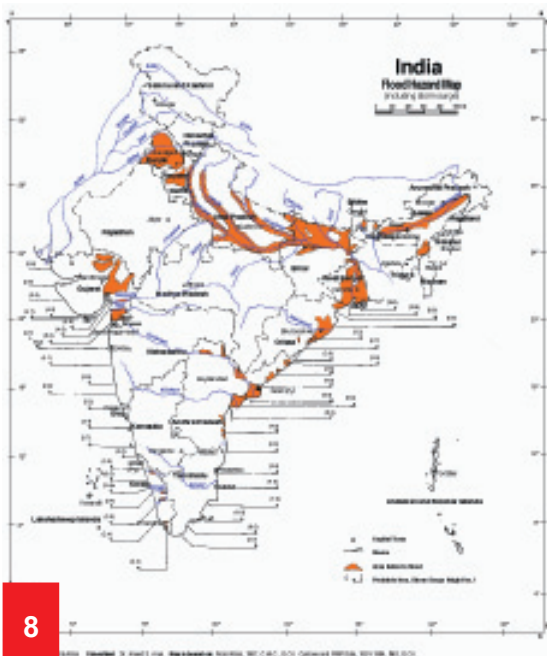
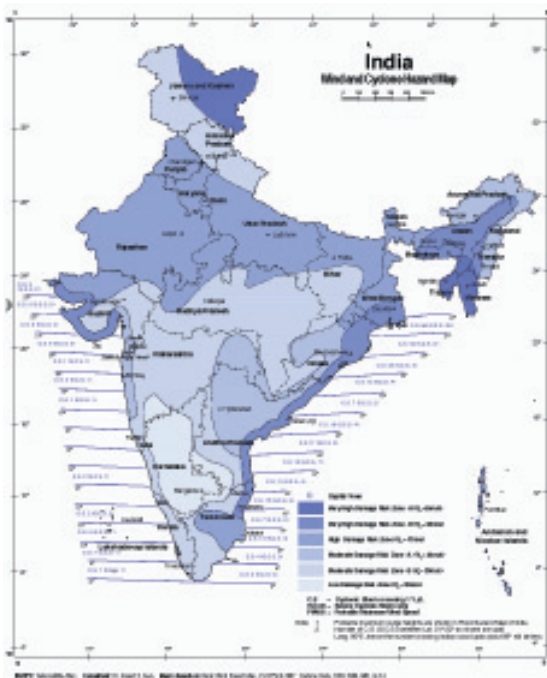
A revised model for Urban & Regional Planning and Development law was brought out, and guidelines on Urban Development Plan Formulation and Implementation (UDPFI) have been formulated in 1991.



NOTE: Towns falling at the boundary of zones demarcation line between two zones shall be considered in High Zone.

5.2 Vulnerability Atlas of India, 1997

Under the initiative of the Ministry of Urban Development, a Vulnerability Atlas of India was prepared during the period 1994-1997 in which the earthquake, cyclone and flood hazard maps for every State and Union Territory of India have been prepared to a scale of 1:2.5 million. In these maps the boundaries of the districts are clearly shown so that the areas of the districts prone to the various intensities of the hazards are clearly visible. Also the vulnerability of the buildings, as per the Census of Housing 1991, has been brought out in tabular form in one sheet for each District. This information clearly highlights the risk to the buildings of various types in every District when subjected to the different intensities of the three hazards. As an extension, State-wise Vulnerability Atlases also have been prepared including an Action Plan that the State may adopt for achieving disaster reduction.



Distribution of Houses by Predominant Materials of Roof and Wall* and Level of Damage Risk

Table No. : I

INDIA

Wall and Roof Construction	Census Houses		Level of Risk under												
	No. of Houses	%	EQ Intensity MSK				Wind Velocity m/s				Flood				
			≥ IX	VIII	VII	≤ VI	33 & 30	47	14 & 18	33	From	Prot. side	Outside		
			Area in %				Area in %				Area in %				
11.5	10.3	20.5	45.7	5.0	40.2	49	0.7	4.9	2.5	92.6					
CATEGORY - A															
A1. Mud Wall															
a) Sloping roof	Urban	9,422,310	2.78												
	Rural	87,104,590	29.29												
	Total	96,527,399	32.00												
A2. Unburnt Brick wall															
a) Sloping roof	Urban	1,837,714	0.59												
	Rural	9,981,794	8.10												
	Total	11,819,508	12.69												
b) Flat roof	Urban	1,10,042	0.06												
	Rural	161,492	0.08												
	Total	271,534	0.14												
A3. Stone Wall															
a) Sloping roof	Urban	2,111,974	1.08												
	Rural	12,445,497	6.38												
	Total	14,557,471	7.46												
b) Flat roof	Urban	2,308,017	1.18												
	Rural	4,826,933	2.48												
	Total	7,134,950	3.66												
Total - Category - A															
96,491,299 30.43															
CATEGORY - B															
B. Burnt Brick Wall															
a) Sloping roof	Urban	12,851,030	6.58												
	Rural	22,104,296	11.56												
	Total	34,955,326	17.04												
b) Flat roof	Urban	19,418,862	9.90												
	Rural	14,462,336	7.43												
	Total	33,881,198	17.33												
Total - Category - B															
68,837,524 36.33															
CATEGORY - C															
C1. Concrete Wall															
a) Sloping roof	Urban	741,137	0.38												
	Rural	638,790	0.33												
	Total	1,379,927	0.71												
b) Flat roof	Urban	2,054,864	1.06												
	Rural	917,995	0.37												
	Total	2,972,859	1.23												
C2. Wood Wall															
a) Sloping roof	Urban	1,070,593	0.55												
	Rural	1,795,640	0.92												
	Total	2,866,233	1.47												
C3. Stone Wall															
a) Sloping roof	Urban	85,899	0.03												
	Rural	201,028	0.10												
	Total	286,927	0.13												
Total - Category - C															
7,073,841 3.63															
CATEGORY - X															
X1 - GI and other Metal Sheets															
a) Sloping roof	Urban	764,960	0.39												
	Rural	291,810	0.15												
	Total	1,056,770	0.54												
X2 Bamboo, Thatch, Grass, Leaves etc.															
a) Sloping roof	Urban	1,198,312	1.64												
	Rural	18,432,640	9.45												
	Total	19,630,952	11.09												
Total - Category - X															
22,687,843 11.81															
GRAND TOTAL															
196,034,357 100															

Building Category
 Category - A: Buildings in brick masonry, mud masonry, unburnt brick masonry, clay houses
 Category - B: Ordinary built-in building, built-up of the long brick and prefabricated type, built-in masonry, building in mud wall form etc.
 Category - C: Reinforced building, well built masonry structures
 Category - X: Other types not covered in A,B,C. These are generally light.
 Notes:
 * Source: Census of Housing, GOI, 1991
 ** With possibility of more severe damage under fully of protection walls
 *** The local damage may be more severe under heavy rain.
 Building Materials & Technology Promotion Council
 Expert Group, MOU&E, GOI

Knowing the extent of the problem of future disasters, the Atlas serves as a useful tool for the authorities in formulating development plans for (a) preventive actions like hazard resistant construction, retrofitting and upgrading of existing buildings, (b) mitigating the intensity and extent of the disaster, (c) warning system installation and drills for its use, (d) instituting a hierarchical structure for preparedness down to the settlement level, (e) training of manpower in various tasks in the emergency, (f) implementation of land zoning regulations in flood plains and coastal regions, and building byelaws with disaster resistant features in various towns and cities, etc.

5.3 National Building Code

National Building Code prepared by the Bureau of Indian Standards in 1970 and subsequent revisions are advisory in nature and not mandatory.

The various provisions in the Code are framed by a panel of experts keeping other standards in view. It lays down a set of minimum provisions designed to protect the safety of the public with regard to structural sufficiency, fire hazards and health aspects in buildings. So long these basic requirements are made, the choice of materials, method of design and construction is left to the ingenuity of the architect and the engineers and other experts engaged in such projects. The code also covers aspects of administrative requirements and bye-laws including building services.

6 STATE LEVEL LEGISLATION

The planning and development are mainly the State subjects and therefore, the development in the States is based on the legislative support as applicable in that State.

The legislative support in the state is applicable to formulate Master Plans, Zonal Plan, Development Plans and Development Schemes and for their implementation and enforcement.

7 LEGISLATIVE SUPPORT AT THE LOCAL/MUNICIPAL/PANCHAYAT LEVEL

At the local level, the Municipal Authorities and Panchayat regulate the development/construction of buildings through the building regulation/building bye-laws as followed in their respective areas.

The State Government from time to time issues directions/guidelines for safety against natural hazards, which are followed by local bodies while granting permission for construction of buildings/structures.

8 INITIATIVE TAKEN TO STRENGTHEN LEGISLATIVE FRAMEWORK FOR SAFETY AGAINST NATURAL HAZARDS

The State Governments have based their legislation, regulation and bye-laws on the guidelines issued by Central Government.

Post disaster studies of some of the devastating earthquakes like Uttarkashi Earthquake (M-6.6) in October 1991, Killari earthquake (M-6.3) 1993, Chamoli Earthquake (M-6.8) in March 1999 and Kutchch Earthquake (M-6.9) in January 2001 showed the need for planning and engineering intervention in development plan, design and construction of buildings to make them strong enough to withstand the impact of natural hazards and to impose restrictions on landuse so that the exposure of the society to the hazard situation is avoided or minimized. Due to lack of adequate or no landuse restrictions in the hazard prone areas in the town and country planning laws, Master Plan rules or bye-laws, cities tend to expand in all directions, occupying even most vulnerable areas resulting in vulnerability of more and more areas getting threatened by natural hazards. Realizing this an urgent need was felt for establishing a proper techno-legal regime through appropriate provisions for safety against natural hazards.

The Expert Committee constituted by the Ministry of Home Affairs studied the existing

guidelines, Acts, Regulations, Development Control Rules and Bye-laws and prepared a Model Building Regulations to enable the States in Seismic Zones III, IV and V (based on M.M.Intensities VII, VIII and IX or more respectively) to adopt them for safety against natural hazards.

9 MODEL TOWN AND COUNTRY PLANNING LEGISLATION, ZONING REGULATIONS, DEVELOPMENT CONTROL, BUILDING REGULATIONS/BYE-LAWS - SALIENT FEATURES

9.1 Recommendations for Amendment in Model Town & Country Planning Act, 1960 and Model Regional & Town Planning and Development Law, 1985

These cover the following aspects:

- Addition of definition of Natural Hazard, Natural Hazard Prone Areas, Natural Disaster and Mitigation
- To keep in view natural hazard proneness in preparation of Development Plans by Local Planning Authorities
- Due consideration to follow the Regulations pertaining to Land Use Zoning and necessary protection measures in perspective and

Development Plan of State, district and local planning areas

- Existing map(s) to indicate hazard provisions of the area

9.2 Regulations for Land Use Zoning for Natural Hazard Prone Areas

The regulations for land use zoning for natural hazard prone areas are notified under Town and Country Planning Act as applicable in the respective States as and when Master Plan/ Development Plan of different cities/towns/areas are formulated. These zoning regulations are implemented through the provisions of Development Control Regulation/Building Bye-laws, wherever the Master Plan are not in existence or not formulated.

Classification of urban land use is based on the sequences of various plans as shown below:

Perspective Plan	-	Policy document
Development Plan	-	Comprehensive plan indicating use of each parcel of land
Layout of Projects	-	For detailed layout of projects/ schemes



The main purpose of the land use zoning is to provide regulations for development of a particular area to serve the desired purpose efficiently and to preserve its character. It also provides for the kind of buildings to be constructed. Zoning regulations are legal tools for guiding the use of land and protection of public health, welfare and safety. Such regulations also include provision for the use of premises/property and limitations upon shape, size and type of buildings that are constructed or occupy the land. These provide both horizontal as well as vertical use of land and also improve the quality of life in urban areas.

A detailed guideline for land use zoning has been prepared with an objective to regulate land use in hazard prone areas to minimise the damage caused to the habitat, as a result of natural hazards viz. earthquakes, cyclonic storms, landslides and floods which reoccur from time to time.

This includes:

- Definition of natural hazard, natural hazard prone areas, natural disaster, mitigation
- Identification of natural hazard prone areas with respect to earthquakes, cyclones, floods and landslides
- Specific recommendations for land use zoning for earthquake, landslide, cyclone and flood prone areas
- Protection measures of buildings of essential services and installations from natural hazards in hazard prone areas
- Prioritization of types of buildings for land use zoning:

Priority 1: Defence installation, industries, public utilities, life line structures like hospitals, electricity installations, water supply, telephone exchange, aerodromes and railway stations; commercial centres, libraries, other buildings or installations with contents of high economic value.

Priority 2: Public and Semi Public institutions, Government offices, and residential areas.

Priority 3: Parks, play grounds, wood lands, gardens, green belts, and recreational areas.

- Regulation for land use zoning shall be an over riding effect on any other regulation.
- For any relaxation, adoption of safe guard and protective measures to the satisfaction of the Competent Authority will be incumbent on the part of user.
- Additional provisions with regard to land use zoning for natural hazard areas are suggested in Model Planning Legislation.

State Governments have been advised to suitably incorporate the modification in their respective Planning Legislation (s), so that regulation for land use zoning for natural hazard prone areas may be notified by the Competent Authority under the above legal provision.

9.3 Additional provisions in Development Control Regulations/Bye-laws for Safety in Natural Hazard Prone Areas

9.3.1 Development Control Regulations and Bye-laws

To regulate development within the framework of a development plan regulation, known as development promotion regulation prescribed as a part of the development plan. The basic purpose of such regulations is to promote quality of life of people by organizing the most appropriate development of land in accordance with the developmental policies and the land use proposals contained therein.

- Registration preferred - Registration, qualification and duties of professional defined.
- In order to bring professionalism in all development and construction work, specially with respect to safety against natural hazards, registration of the following professionals have been recommended mandatory requirement.
 - Structural engineer - qualification and experience defined on the basis of types and importance of structures
 - Engineers
 - Construction Engineer (RCE)

- Construction Management Agency – owner shall be a RCE
- Quality Auditor
- Architect
- Geotechnical Agency
- Town Planner
- Developer
- The owner/developer shall appoint the professionals from the registered professionals and will submit a list of professionals on Record with the application for development permission to the Competent Authority.
- Indication of designation and registration number of each professional on every plan, document prepared by him/her made compulsory.
- Structural engineer on Record and Architect on Record shall be responsible for adhering to the provision of the relevant and prevailing Indian Standards.
- Procedure for securing Development Permission requires certificate of undertaking in the prescribed form by the Owner, Developer, Structural Engineer on Record and Architect on Record and Construction

Engineer on Record regarding the mandatory application of all structural safety regulations including safety from natural hazards in both design and construction of the buildings.

- Adequate protection clause for land liable to liquefaction, storm surge and landslide.
- For adequate record and checking compulsory submission of detailed working drawing/structural drawing alongwith soil investigation report before the commencement of the work.
- For Structural Design details of various National Standards/Codes relating to structural safety from natural hazards as listed below have been included for guidance of the professionals to design the structures/buildings, keeping in view the provision of such codes against different hazards.

9.3.2 Structural Design Basis Report

To ensure the compliance of various codes, Structural Engineer on Record is required to submit Structural Design Basis Report in prescribed proforma for applicable type of

Indian Standards/Codes relating to Structural Safety from Natural Hazards

For General Structural Safety

1. IS: 456:2000 "Code of Practice for Plain and Reinforced Concrete (Fourth Revision)
2. IS: 800-1984 "Code of Practice for General Construction in Steel (Second Revision)
3. IS: 801-1975 "Code of Practice for Use of Cold Formed Light Gauge Steel Structural Members in General Building Construction (Second Revision)
4. IS 875 (Part 2):1987Design loads (other than earthquake) for buildings and structures Part2 Imposed Loads (Second Revision)
5. IS 875 (Part 3):1987Design loads (other than earthquake) for buildings and structures Part 3 Wind Loads (Second Revision)
6. IS 875 (Part 4):1987Design loads (other than earthquake) for buildings and structures Part 4 Snow Loads (Second Revision)
7. IS 875 (Part 5):1987Design loads (other than earthquake) for buildings and structures Part 5 special loads and load combination (Second Revision)
8. IS: 883:1966 "Code of Practice for Design of Structural Timber in Building (Fourth Revision)
9. IS: 1904:1987 "Code of Practice for Structural Safety of Buildings: Foundation" (Third Revision)
10. IS1905:1987 "Code of Practice for Structural Safety of Buildings: Masonry Walls (Third Revision)
11. IS 2911 (Part 1): Section 1: 1979 "Code of Practice for Design and Construction of Pile Foundation (First Revision)
 - Part 1: Section 2 Based Cast-in-situ Piles
 - Part 1: Section 3 Driven Precast Concrete Piles
 - Part 1: Section 4 Based precast Concrete Piles
 - Part 2: Timber Piles
 - Part 3: Under Reamed Piles
 - Part 4: Load Test on Piles

structure. Design Basis Report format for Load Bearing Buildings, Reinforced concrete framed building and structural steel, interalia, include essential elements of design required for safety against hazard.

In compliance of the design with the above Indian Standard, the Structural Engineer on Record will submit a Structural Design Basis Report in the prescribed Proforma covering the essential safety requirements specified in the Standard.

(i) The "Structural Design Basis Report (SDBR)" consists of four parts

Part-1 - General Information/ Data

Part-2 - Load Bearing Masonry Buildings

Part-3 – Reinforced Concrete Buildings

Part-4 - Steel Buildings

(ii) Drawings and Documents to be submitted for approval of appropriate authorities shall include SDBR as detailed below:

Part - 1 Completed

Part - 2 (if applicable) – completed

Part -3 (if applicable) – undertaking that completed Part 3 will be submitted before commencement of construction.

Part- 4 (if applicable) – undertaking that completed Part 4 will be submitted before commencement of construction.

(iii) SDBR as detailed below shall be submitted to the appropriate authority as soon as design of foundation is completed, but not later than one month prior to commencement of construction.

Part-1 Completed

Part-2, Part-3 or Part-4 (if applicable) Completed

9.3.3 Seismic Strengthening of Existing Building

Prior to seismic strengthening/ retrofitting of any existing structure, evaluation of the existing structure as regards structural vulnerability in the specified wind/ seismic hazard zone shall be carried out by a Registered Structural Engineer (RSE) / Registered Structural Design Agency (RSDA). If as per the evaluation of the RSE/ RSDA the seismic resistance is assessed to be

For Cyclone/Wind Storm Protection

12. IS 875 (3)-1987 "Code of Practice for Design Loads (other than Earthquake) for Buildings and Structures, Part 3, Wind Loads" (Second Revision)

13 IS 15498 Guidelines for improving the Cyclonic Resistance of Low rise houses and other buildings (Under Print)

For Earthquake Protection

14 IS: 1893-2002 "Criteria for Earthquake Resistant Design of Structures (Fifth Revision)"

15 IS:4326-1993 "Earthquake Resistant Design and Construction of Buildings - Code of Practice (Second Revision)"

16 IS:13828-1993 "Improving Earthquake Resistance of Low Strength Masonry Buildings - Guidelines"

17 IS:13827-1993 "Improving Earthquake Resistance of Earthen Buildings - Guidelines",

18 IS:13920-1993 "Ductile Detailing of Reinforced Concrete Structures subjected to Seismic Forces - Code of Practice"

19 IS:13935-1993 "Repair and Seismic Strengthening of Buildings - Guidelines"

For Protection of Landslide Hazard

20 IS 14458 (Part 1): 1998 Guidelines for retaining wall for hill area: Part 1 Selection of type of wall.

21 IS 14458 (Part 2): 1997 Guidelines for retaining wall for hill area: Part 2 Design of retaining/breast walls

22 IS 14458 (Part 3): 1998 Guidelines for retaining wall for hill area: Part 3 Construction of dry stone walls

23 IS 14496 (Part 2): 1998 Guidelines for preparation of landslide – Hazard zonation maps in mountainous terrains: Part 2 Macro-zonation

Note: Whenever an Indian Standard including those referred in the National Building Code or the National Building Code is referred, the latest revision of the same shall be followed except specific criteria, if any, mentioned above against that code.

less than the specified minimum seismic resistance in the note below, action will be initiated to carry out the upgrading of the seismic resistance of the building as per applicable standard guidelines.

9.3.4 Review of Structural Design

Provision for proof checking of design by a Senior Structural Engineer selected from the Structural Design Review Panel registered with the Authority has also been introduced.

9.3.5 Supervision

All construction except load bearing buildings upto 3 storeys shall be carried out under supervision of Construction Engineer or Construction Management Agency on Record.

9.3.6 Quality Control and Inspection

To ensure proper quality, it is recommended that all the construction for high rise buildings higher than seven storeys, public buildings

and special structures shall be carried out under quality inspection programme prepared and implemented under Quality Auditor on Record or Quality Auditor Agency on Record in seismic zone IV and V.

9.3.7 Control of Signs (hoardings) and Outdoor Display Structure and Paging Tower and Telephone Tower and Outdoor Display Structures

Adequate provisions have been made for safety of above structures.

9.3.8 Inspection

Generally all development work for which permission is required shall be subject to inspection by Competent Authority as deemed fit.

The applicant shall keep a board at site of development mentioning the survey No, city survey No, Block No, Final Plot No., Sub plot No., etc. with names of owner, the Architect, the

PROOF CHECKING REQUIREMENTS FOR STRUCTURAL DESIGN

SR NO	TYPE OF STRUCTURE	SUBMISSION FROM SER or SDAR	TO BE PROOF-CHECKED
01	LOAD BEARING BUILDINGS UPTO 3 STOREYS	SDBR*	NOT TO BE CHECKED
02	BUILDINGS UPTO SEVEN STOREYS(R.C.C /STEEL FRAMED STRUCTURE)	SDBR PRELIMINARY DESIGN	TO BE CHECKED TO BE CHECKED
03	BUILDINGS GREATER THAN SEVEN STOREYS (R.C.C /STEEL FRAMED STRUCTURE)	SDBR PRELIMINARY DESIGN DETAILED STRUCTURAL DESIGN AND STRUCTURAL DRAWINGS	TO BE CHECKED TO BE CHECKED TO BE CHECKED
04	PUBLIC BUILDINGS (A) LOAD BEARING BUILDINGS UPTO 3 STOREYS (B) R.C.C/STEEL STRUCTURES	SDBR SDBR PRELIMINARY DESIGN DETAILED STRUCTURAL DESIGN AND STRUCTURAL DRAWINGS	NOT TO BE CHECKED TO BE CHECKED TO BE CHECKED
05	SPECIAL STRUCTURES	SDBR PRELIMINARY DESIGN DETAILED STRUCTURAL DESIGN AND STRUCTURAL DRAWINGS	TO BE CHECKED TO BE CHECKED TO BE CHECKED

* SDBR – Structural Design Basis Report

Notes: Public building means assembly of large number of people including schools, hospitals, courts etc.

Special structure means large span structures such as stadium, assembly halls, or tall structures such as water tanks, TV tower, chimney, etc.

Structural Engineer, the Construction Engineer as Recorded with the Competent Authority for the project.

Progress certificate to be submitted by owner/ developer/builder at plinth, first storey, middle storey in case of high rise building and last storey stage.

Submission of Completion Report in prescribed format. No Completion Report shall be accepted unless completion plan is approved by the Competent Authority.

Occupancy certificate to be issued only after ensuring all essential information from the owner and architect/engineer on Record.

9.3.9 Maintenance of Building

Adequate provisions have been made for safety of buildings older than fifty years. It shall be duty of the owner of a building, to get his building inspected by a Registered Structural Engineer. The structural Inspection report shall be produced by the owner to the Appropriate Authority. Within five years, action as required, will have to be taken to rectify/strengthen as recommended in the report.

9.3.10 Protective measures in Natural Hazard Prone Areas

Guidelines for protective measures for buildings and installation which can not be avoided in natural hazard prone areas under the land use zoning introduced.

10 CAPACITY BUILDING

Elaborate planning has been made for capacity building of architects/engineers to deal with the design and construction of safe structures.

Training programme for engineers and architects are being organized to impart knowledge about seismically safe construction

and implementation of codal provisions. So far 1088 engineers and 825 architects have been trained.

11 IMPLEMENTATION OF THE RECOMMENDATION

A series of workshops in all the States and Union Territories have been planned so as to disseminate the recommendation of the Model Techno-legal Regime so as to help them to actually modify their Acts/Development Control Rules/Bye-laws, as applicable.

It is hoped that all these efforts should lead to Building a New Techno-Legal Regime for a safer India against the natural hazards.



About BMTPC

Building Materials & Technology Promotion Council (BMTPC), an interministerial body under the Ministry of Urban Employment and Poverty Alleviation, strives to develop and operationalise a comprehensive and integrated approach for technology development, transfer and investment promotion to encourage application of environment-friendly & energy-efficient innovative materials, manufacturing technologies and disaster resistant construction practices for housing and buildings in urban and rural areas.

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