COURSE 4: URBAN LEGAL AND POLICY FRAMEWORKS

Block 1: Infrastructure and Resource Management

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GREEN ZONES, LANDSCAPING AND GREEN BUILDINGS

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1. Introduction

The Earth’s ecosystems are now at a critical stage: they are not only being severely damaged but human activity currently leads to irreversible losses of critical (i.e. life-supporting) ecosystem functions. Buildings and construction works have the largest single share in global resource use and pollution emission. In developed countries the built environment is responsible for around 25-40% of total energy use, 30% of raw material use, 30-40% of global greenhouse gas emissions and for 30 to 40% of solid waste generation.

People generally spend almost 90% of their life inside buildings. In the United States, the annual cost of building-related sickness is estimated to be at $58 billion. Consequently, healthy and comfortable indoor environments contribute significantly to human health and well-being and offer a large potential for reducing ‘external’ costs to societies through lowering diseases. In Northern Europe, people spend over 90% of their time inside and in the winter months, this can rise to almost 100%. If they are not inside, people are usually travelling from one building to another, using civil infrastructure facilities such as roads, bridges and railways. This should not be terribly surprising: apart from a few months (or sometimes days) in the summer, much of the temperate zone could not support human life were it not for the technology we have developed which allows us to survive in this hostile environment. For most people in the developed world, most of the time, the urban environment is their environment. In everyday experience, the wider environment of trees, rivers and the rest of the biosphere has little impact on city dwellers. Environmentalists are therefore usually portrayed as somewhat unbalanced, giving too much importance to nebulous ideals and trying to spoil everyone else’s fun.

The quality of the urban environment obviously has a direct effect on the inhabitants of cities and towns but its also has an effect on the people and environment outside the city limits. Construction of buildings and infrastructure require vast quantities of raw materials, the energy requirements of an urban lifestyle require the extraction and consumption of precious non-renewable resources and the enormous amount of waste generated has to be dealt with out of town.

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1 Based on statistics of R and D studies conducted by Isover, Saint Gobain Insulation.
City life provides a large number of people with all their physical requirements, while isolating them from the consequences of their behaviour. Nothing turns people into vegetarians quite like a visit to an abattoir, and this principle applies equally to degradation of the environment. Take for example the fate of food packaging. At no point in the supply chain from production to disposal does anyone take any responsibility for the effect of their activities. There is no immediate reason why they should, as these effects take place somewhere else. They are, in economic terms, external costs and as such have no effect on profit, which is the reason for the existence of the supply chain. There is therefore no pressure for change.

This same principle holds true for many aspects of the urban environment. Buildings, for example, are made by one party, sold to another and demolished by a third. The economic structure of the situation encourages each party to act for immediate, short-term gain. Any consideration of longer-term consequences would cost money for the individual concerned. However, avoiding such consideration has wider costs for us all.

The infrastructure required to support the urban environment includes communications links, supplies of power, food and water, sewage and waste processing systems and a myriad of lesser support functions, all vital to the continued functioning of the city. Each of these has, to a greater or lesser extent, a detrimental impact on the quality of the wider environment and, in some cases, that of the urban environment too. Reservoirs drown valleys and sewage sludge contaminates the seas and fields, landfill sites stink and pollute groundwater with toxic leachate. Roads are required to bring food and other goods into the cities but the traffic reduces air quality, leading to health effects and a reduced quality of life.

The physical structure of a city causes detrimental environmental effects in a variety of ways. The materials used to make buildings must be extracted and processed, then transported to the city. Covering vast areas with impermeable tarmac and concrete causes storm runoff which flushes surface pollutants and untreated waste into rivers and the sea. Careless design of buildings unnecessarily wastes energy and water and reduces the quality of life of the inhabitants through higher bills, poor indoor environment and lack of facilities.

There is a common underlying presumption among environmental commentators that urbanisation and the industrial society are the worst things that have ever happened to the world. There is often an implication that we should be making every effort to return to an idyllic pastoral lifestyle which was supposed to have existed at some undefined point in history prior to the industrial revolution. However, there are a number of problems with this way of thinking. Firstly, although environmental degradation was undoubtedly less severe during this golden age, so was the size of the population, life expectancy and standard of living. Biodiversity was greater but so was infant mortality, poverty, disease and hunger.

Beyond individual buildings, poor patterns of building development often lead to congestion and inefficient use of land, resulting in greater energy consumption and travel time, loss of productivity, polluted runoff to surface water and wastewater treatment systems, loss of agricultural lands, fragmented habitats, and fiscal stress to local communities.

There is a growing perception that life in the world’s cities is growing steadily and inexorably worse. Disciples of this view hold that decisive action must be taken now to
slow this decline and that only a radical change of lifestyle for all of us could ever hope to reverse it. If this is so, then it is a fundamental problem for us all. In the developed world, the huge majority of people live in an urban environment. In the developing world, the proportion of urban dwellers is smaller but still growing at an exponential rate as a result of population growth and migration towards the cities.

2. Sustainable Construction

Environmental degradation, like the human population that causes it, did not spontaneously begin at some point in recent history. For the developed countries of northern Europe and Asia, a convenient starting point for the history of our environment would be the end of the last ice age, around 10,000 years ago. For many millions of years before this the area was buried under kilometers of ice. With the retreat of the ice sheet, the area was colonised by hardy plants and arctic animal species and as the climate continued to improve, biodiversity increased as a wider variety of organisms was able to thrive. Humans moved into the area as it developed the capacity to support them and within two or three millennia had established fixed settlements. At around this point, large areas of forests began to be cleared and species started to be extinguished. This process has been continuing ever since.

The industrial revolution did undoubtedly have a dramatic accelerating effect on this process, coupled with the beginning of reliable measurements and records. However, the process has been inextricably linked with human development in general; as population increases, so does pollution. The fact that quality of life has also increased at a comparable rate is often overlooked.

The UK Government has recently taken the first steps toward defining quality of life indicators, which include social, economic and environmental issues in an attempt to give an overall indication of progress toward (or away from) sustainable development. In the supposed “golden age”, environmental measures would have been well represented but performance to economic and social indicators would have been extremely poor. Today that situation is reversed but the overall effect is still an improvement. This is particularly so if you consider per capita impact: the population of Europe in 1994 was around 509 million, a 30% increase since 1950; and this is among the lowest rates of increase in the world.

At the moment, the per capita impact on the environment of an urban lifestyle is around ten times that of a more dispersed, rural lifestyle. However, it is hard to imagine the current population of the developed world dispersed throughout the countryside, living a supposed low-impact life. Firstly, we would not know how and secondly, there isn’t enough room. It appears more likely that the only way to support the existing population is to continue development of the urban model to let each area do what it does best: live in the towns and use the countryside to support the towns with food, water and other requirements.

The answer to the problems of the Urban Environment is not to turn the clock back but to keep going forward. But surely if we are to do this, today’s problems will only get worse. What about the traffic gridlock? What about air quality? And waste, sewage, resource depletion, etc. Surely if we keep going on our present course we are headed for disaster.
This would be fair comment if we continue to make decisions today using the knowledge and experience of 50 years ago (as has happened in some cases, such as the roads programme) but today we are aware of the problems that have been caused by past mistakes and we can learn from them. For each of the problems identified above there is a sustainable solution. In many cases there is considerable inertia slowing movement from the old methods to the new but we do have the answers now and we are capable of solving the problems we face. The now famous new Report to the Club of Rome, Factor Four, sets out in simple detail how it is possible, with existing technology, to reduce energy consumption by 75% or more. In the context of the environmental damage caused by energy consumption in the developed world, it seems incredible that we have not already embraced this approach. There is no need to build further power stations, no need for dirty technologies like coal and nuclear power at all. It is only the combination of a lack of awareness and a flawed economic system that allows this absurd situation to continue.

Every one of us is paying at least four times as much as we should to heat our homes, travel to work and do all the other energy-intensive things we like to do. And of course, these costs are passed on to us in everything we buy which also has to be processed and transported.

The urban environment can be viewed on several different levels, from the basic infrastructure up to the overall effects of urban living. Many aspects of city life generate direct impacts on the wider environment and on the inhabitants of the cities. However, many of the major concerns, such as air quality and traffic congestion arise from the complex interaction of a multitude of simple factors. The study of complexity and emergent behaviour is a relatively young discipline, which is reflected in the limited success we have enjoyed so far in addressing these problems.

Complex systems like cities have so many interacting influences that the application of any measure intended to modify one aspect will have secondary effects throughout the system. For example, the introduction of Greenways (dedicated bus lanes) in Edinburgh has succeeded in increasing the speed and popularity of bus journeys through the city. It has also altered the dynamics of traffic flow and parking through the city to the extent that shopkeepers in some areas claim they are being forced out of business. This was not the intention of the measure but it still falls to the politicians charged with running the city to decide whether the overall outcome is to the greater good.

Many of these effects are so intertwined and act on each other in such unexpected ways that it is often difficult to praise them apart so that they can be addressed individually. The complexity of the situation can make tackling the problems seem a daunting, even impossible task. However, there is already a small but growing movement which aims to improve every aspect of urban life, in terms of its effects on both consumers and producers, city dwellers and the environment. Whichever aspect of the current situation you choose, you will find a group of self-motivated individuals trying to improve it.

Take some of the examples used so far. Water supply is a problem for many cities but we already have low flush WC facilities, even composting toilets which require no water. Sewage treatment similarly displays all the signs of a problem solved by Victorian engineering, which is now too big for that solution. But if you follow up the “supply chain” of sewage, you find the European Parliament setting minimum environmental standards, which are imposed on the Environment Agencies, which enforce them on the water authorities. This problem is not getting worse, despite growth in the number of “suppliers”.
Road transport has a reputation for causing air pollution, congestion and not a little frustration, while reducing the quality of life of all concerned. The question is whether it is reasonable. As a working generalisation, people live out of town because they choose to (often because of the air pollution caused by cars). If they could not do this, they would either have to live in town (reducing their perceived quality of life) or work outside town (reducing their income). Presumably most commuters who have thought about it consider that the price they pay to commute, in terms of reduced free time, health, quality of life and so forth, are outweighed by the increase in job satisfaction, income and other factors. The exponential increase in the growth of commuter traffic that has taken place over the past few decades would seem to lend weight to this interpretation.

However, with each additional car on the road during the rush hour, the price increases but the rewards do not. Thus, the plight of commuters grows ever worse and the situation begins to climb the political agenda. Commuter traffic has come to represent the worst aspects of city life. It is often portrayed in the press as an insoluble problem, set to grow ever worse. This is simply unreasonable: there are a number of solutions, with a wide range of political palatability, such as road pricing, parking charges, investment in public transport and even tele-working. As the situation worsens, the most acceptable solutions will appear preferable and be adopted.

Similarly, when building the structures that form our cities, circumstances encourage behaviour that maximises short-term gain at the expense of long-term prosperity. The current economic climate encourages builders to complete each development as cheaply as possible. There are certain rules and standards which must be observed but to win a contract and then complete it profitably, the only other considerations are economic. This is not an unreasonable situation: we all have to eat and the market economy appears to be the least bad way of fulfilling this need. However, the situation is causing considerable problems for the wider environment; so much so that it is beginning to threaten our quality of life. It is time to sit up and take notice.

The solution to this problem, as to the other examples, lies in a combination of education and economics. We have developed the urban environment and improved the standard of living in the developed world at the expense of the wider environment. However, we are now starting to realise that this cannot go on. Having already opened our eyes to the problem, we need to establish what can be done about it. For each of the examples above and for many others, there are already solutions. What is required now is the will to implement them.

To a large extent, these solutions will be implemented when the costs become so great that the sustainable solution becomes the cheapest solution. But this requires that the full costs of all our actions are reflected in the simple, financial price we pay. This is where the economic part of the solution comes in. Schemes have already been suggested for road pricing and parking charges in major cities. These are a first attempt to incorporate some of the additional costs of commuting into the price paid by the commuter. These costs include a reduction in air quality, health effects, danger and reduced quality of life for city dwellers. The small charges proposed are unlikely to come close to accounting for these costs but they are a step in the right direction. Most importantly, once this precedent has been set and people become used to paying for environmental benefits, it will be an easier matter to increase the price so that they are paying the real cost.
Market economics has proved itself in recent times to be the most effective and efficient form of government. In terms of sustainability, the only fault in the system is that incomplete information is fed into it, so that inappropriate actions result. If we are to sustain our developed way of life, we must learn to identify the full costs of our actions and begin to take appropriate steps to incorporate them into the existing economic system. The longer we delay this course of action, the larger our overdraft becomes and the more we will have to repay in the end. However, the first signs are already appearing to indicate that we are waking up to the reality of our predicament.

Sustainable movements such as Factor Four and Factor Ten, show that we already have the capability to maintain our quality of life using a sustainable level of resources. What is now required is not a radical change of lifestyle but a gradual acceptance that we know how to live sustainably and the sooner we begin to move in this direction, the easier it will be. Besides, full cost accounting still includes the original economic factors, so any move toward sustainability will, by definition, also be an increase in prosperity. Saving the world is not just the right thing to do, it’s the selfish thing to do.

Factor Four and Factor Ten

Factor four is a simple yet radical concept and was introduced in 1998, in a book of the same name written by L. Hunter Lovins and Amory Lovins of the Rocky Mountain Institute, and Ernst von Weizsäcker, founder of the Wuppertal Institute for Climate, Environment and Energy. This is illustrated with 50 examples of technologies that could be called upon to deliver the necessary improvement in resource efficiency, including ultra fuel-efficient cars, low-energy homes.

It is suggested in the book the Factor Four Practices hold the key to sustainable development. It refers to a hypothetical fourfold increase in ‘resource productivity’, brought about by simultaneously doubling wealth and halving resource consumption.

Its origins date back to 1972, when a report by the Club of Rome called ‘Limits to Growth’ issued a stark warning that economic growth was using up resources at a rate that could not be sustained for much longer.

Often mentioned in the same breath as Factor 4 is ‘Factor 10’, whose proponents argue that in the long term, resource use in developed countries needs to be slashed tenfold if we are to approach sustainability. The reasoning behind this is that globally, consumption needs to be halved, but that the greatest reduction should be borne by those countries that are currently the most profligate in their use of resources.

Factor Ten refers to the possibility of creating products and services that have a massively lower resource intensity than the conventional alternative.

It evolved from the concept of factor four. Factor Ten goes further as a response to the United Nations Environment Programme call for a tenfold reduction in resource consumption in the industrialised countries as a necessary long-term target if adequate resources are to be released for the needs of the developed countries.
While standard building practices are guided by short term economic considerations, sustainable construction is based on best practices which emphasize long term affordability, quality and efficiency. At each stage of the life cycle of the building, it increases comfort and quality of life, while decreasing negative environmental impacts and increasing the economic sustainability of the project. A building designed and constructed in a sustainable way minimizes the use of water, raw materials, energy, land ... over the whole life cycle of the building.

Although new technologies are constantly being developed to complement current practices in creating greener structures, the common objective is that green buildings are designed to reduce the overall impact of the built environment on human health and the natural environment by:

♣ Efficiently using energy, water and other resources
♣ Protecting occupant health and improving employee productivity
♣ Reducing waste, pollution and environmental degradation

A similar concept is natural building, which is usually on a smaller scale and tends to focus on the use of natural materials that are available locally. Other related issues include sustainable design and green architecture.

Sustainability may be defined as meeting the needs of present generations without compromising the ability of future generations to meet their needs. Green building does not specifically address the issue of the retrofitting existing homes.

What is Sustainable Construction?

Sustainable construction means cities and buildings that respond to the emotional and psychological needs of people by providing stimulating environments, raising awareness of important values, inspiring the human spirit, and bonding societies, communities and neighbourhoods. Sustainability in construction projects is generally achieved by:

♣ Defining clear goals sympathetic to sustainability issues.
♣ Concentrated effort at design stage to achieve these goals.
♣ Focussing on decisions like site selection, building layout, design etc.
♣ Choosing the right materials which are recyclable after their useful lives.
♣ Choosing the right methods of construction in terms of energy and resource efficiency.
♣ Creating an efficient and integrated building envelope harnessing the gifts of nature.
♣ Integrating HVFAC and electrical systems.

One of the main demerits of Sustainable Construction is the slight increase in construction costs. Professionals in the construction sector tend to estimate the cost of constructing a green building to be 17% higher than the cost of building a conventional structure. This is attributed as the major obstacle to the construction of environmentally-friendly buildings. However, this is highly compensated by savings and advantages all over the use phase.
The ownership of sustainable buildings results in clear benefits for investors, ranging from drastically lower operating costs to improved marketability, longer useful life-spans, significantly increased occupant productivity and well-being as well as more stable cash-flows which in turn have economically quantifiable benefits. As a result, increasing economic return, sustaining the natural environment and protecting social values are not incompatible; at least not within property and construction markets.

3. Green Buildings and Sustainable Designs

Sustainable is a buzz word, however, defining sustainability in buildings is a complex concept. There have been various popular definitions of sustainable buildings. USGBC (United States Green Building Council), one of the pioneers in propagating green buildings across the globe “The term ‘green building’ is synonymous with ‘high performance building’, ‘sustainable design and construction’ as well as other terms that refer to a holistic approach to design and construction.”

With the world witnessing a major environmental crisis, the concept of Sustainable Design has come to the forefront particularly in the last two decades. The concept of Sustainable Design is related to Green Building Design, and involves the use of techniques that are in conformity with nature, rather than against it. It involves a dynamic change in the way we design our modern structures and systems to ensure the sustainability of the resources and the eco-system.

It is now being increasingly realised across the world that the benefits of sustainable design are not limited to the environment alone, but can rather have a significant effect on your bottom-line as well. Well designed sustainable design systems go a long way in reducing operational costs by avoiding resource wastage. Besides, adopting the sustainably approach creates improved goodwill within the consumers and the corporate world at large. The benefits of sustainable designs include:

♣ **Environmental:** Structures built on the sustainable design model place minimal impact on the environment. This is accomplished through the prudent use of resources and by deploying systems for recycling and renewable energy sources such as solar power and wind energy.

♣ **Financial:** Sustainability principles integrated early within the design, offer improved life cycle costs as compared to conventional buildings due to reduced maintenance and replacement. Additional cost savings are obtained through the use of recycling systems and renewable energy sources.

♣ **Social:** The availability of improved air quality and natural light helps boost employee morale and productivity. Reduced strain on resources increases the availability of those resources within the specific eco-systems and geographical regions.

Green building (also known as green construction or sustainable building) refers to a structure and using process that is environmentally responsible and resource-efficient throughout a building’s life-cycle: from siting to design, construction, operation, maintenance, renovation and demolition. This practice expands and complements the classical building design concerns of economy, utility, durability and comfort.
“Green building design strives to balance environmental responsibility, resource efficiency, occupant comfort and well-being, and community sensitivity”.\textsuperscript{1} TERI, a not-for profit organisation working in the field of sustainable development defines it as, “A Green building is designed, constructed and operated to minimise the total environmental impacts while enhancing user comfort and productivity”.

Some of the key attributes of Sustainable buildings are as under:

- Consideration of sustainability aspects in all phases of building design and planning
- Consideration of sustainability aspects during construction and production of building materials
- Use of healthy and environmentally friendly building materials and products
- Use of efficient systems
- Use of constructions and systems which are easy to maintain and service
- Safeguarding of high functionality, flexibility and adaptability
- Safeguarding of health and comfort of users, occupiers and visitors
- High aesthetic and urban design quality; high public acceptance
- Appropriate location with good access to public transportation services and networks

In a nutshell, sustainable buildings use less energy and water, generate less greenhouse gases, use materials more efficiently, and produce less waste than the conventional buildings over their entire life cycle.

A 2009 report by the U.S. General Services Administration found 12 sustainably designed buildings cost less to operate and have excellent energy performance. In addition, occupants were more satisfied with the overall building than those in typical commercial buildings.

The Indian Green Building Council provides the following definition - “A green building is one which uses less water, optimises energy efficiency, conserves natural resources, generates less waste and provides healthier spaces for occupants, as compared to a conventional building.”

The concept of Green Building is essentially based on the premise that economic development and urbanisation need not go against the flow of nature. Green Building principles reflect through the complete building life cycle and are aimed at reducing impact upon the environment. The essential element of green building is to make the most efficient use of resources such as energy, water and material, and to ensure that the building maintenance activities do not burden the environment.

Organisations around the world now increasingly realise that the additional investments in making their structures ‘green’ is not only good for the environment but also provide long-term tangible benefits in the form of lower operation costs and higher productivity. A Sustainable Design that offers operational returns on investment is a significant and integral concept to designing green buildings.

\textsuperscript{2} LEED-NC Version 2.1 Reference Guide.
The concept of Green Building offers the following key advantages:

♣ Environment Friendly
♣ Energy Efficient
♣ Water Conservation
♣ Fire Safety
♣ Excellent Indoor Air Quality

What makes a building green?

A green building, also known as a sustainable building, is a structure that is designed, built, renovated, operated, or reused in an ecological and resource-efficient manner. Green buildings are designed to meet certain objectives such as protecting occupant health; improving employee productivity; using energy, water and other resources more efficiently; and reducing the overall impact to the environment.

A green building may cost more up front, but saves through lower operating costs over the life of the building. The green building approach applies a project life cycle cost analysis for determining the appropriate up-front expenditure. This analytical method calculates costs over the useful life of the asset.

These and other cost savings can only be fully realised when they are incorporated at the project’s conceptual design phase with the assistance of an integrated team of professionals. The integrated systems approach ensures that the building is designed as one system rather than a collection of stand-alone systems.

Some benefits, such as improving occupant health, comfort, productivity, reducing pollution and landfill waste are not easily quantified. Consequently, they are not adequately considered in cost analysis. For this reason, consider setting aside a small portion of the building budget to cover differential costs associated with less tangible green building benefits or to cover the cost of researching and analysing green building options.

Even with a tight budget, many green building measures can be incorporated with minimal or zero increased up-front costs and they can yield enormous savings. Below is a sampling of green building practices.

1) Siting

♣ Selection of site is very important. A site must be so selected that is well suited to take advantage of mass transit.

♣ Protecting and retaining existing landscaping and natural features. Selection of plants that have low water and pesticide needs, and generate minimum plant trimmings. Using compost and mulches so that it saves water and time.

♣ Recycled content paving materials, furnishings and mulches help close the recycling loop.
2) **Energy Efficiency**

- Passive design strategies can dramatically affect building energy performance. These measures include building shape and orientation, passive solar design, and the use of natural lighting.

- Developing strategies to provide natural lighting. Studies have shown that it has a positive impact on productivity and well being.

- Installing high-efficiency lighting systems with advanced lighting controls. Including motion sensors tied to dimmable lighting controls. Task lighting reduces general overhead light levels.

- Using a properly sized and energy-efficient heat/cooling system in conjunction with a thermally efficient building shell. Steps such as to maximise light colours for roofing and wall finish materials; installation of high R-value wall and ceiling insulation; and usage minimal glass on east and west exposures are effective.

- Minimising the electric loads from lighting, equipment and appliances.

- One should consider alternative energy sources such as photovoltaics and fuel cells that are now available in new products and applications. Renewable energy sources provide a great symbol of emerging technologies for the future.

- Computer modelling is an extremely useful tool in optimising design of electrical and mechanical systems and the building shell.

3) **Materials Efficiency**

- Steps that should be followed include selection of sustainable construction and products by evaluating several characteristics such as reused and recycled content, zero or low off gassing of harmful air emissions, zero or low toxicity, sustainably harvested materials, high recyclability, durability, longevity, and local production. Such products promote resource conservation and efficiency.

- Use dimensional planning and other material efficiency strategies. These strategies reduce the amount of building materials needed and cut construction costs. For example, design rooms on 4-foot multiples to conform to standard-sized wallboard and plywood sheets.

- Reuse and recycle construction and demolition materials. For example, using inert demolition materials as a base course for a parking lot keeps materials out of landfills and costs less.

- Require plans for managing materials through deconstruction, demolition and construction.

- Design with adequate space to facilitate recycling collection and to incorporate a solid waste management programme that prevents waste generation.

4) **Water Efficiency**

- Design for dual plumbing to use recycled water for toilet flushing or a gray water system that recovers rainwater or other nonpotable water for site irrigation.
Minimise wastewater by using ultra low-flush toilets, low-flow shower heads, and other water conserving fixtures.

Use recirculating systems for centralised hot water distribution.

Install point-of-use hot water heating systems for more distant locations.

Use a water budget approach that schedules irrigation using the California Irrigation Management Information System data for landscaping.

Meter the landscape separately from buildings. Use micro-irrigation (which excludes sprinklers and high-pressure sprayers) to supply water in nonturf areas.

Use state-of-the-art irrigation controllers and self-closing nozzles on hoses.

5) Occupant Health and Safety

Recent studies reveal that buildings with good overall environmental quality can reduce the rate of respiratory disease, allergy, asthma, sick building symptoms, and enhance worker performance.

Choose construction materials and interior finish products with zero or low emissions to improve indoor air quality. Many building materials and cleaning/maintenance products emit toxic gases, such as volatile organic compounds (VOC) and formaldehyde. These gases can have a detrimental impact on occupants’ health and productivity.

Provide adequate ventilation and a high-efficiency, in-duct filtration system. Heating and cooling systems that ensure adequate ventilation and proper filtration can have a dramatic and positive impact on indoor air quality.

Prevent indoor microbial contamination through selection of materials resistant to microbial growth, provide effective drainage from the roof and surrounding landscape, install adequate ventilation in bathrooms, allow proper drainage of air-conditioning coils and design other building systems to control humidity.

6) Building Operation and Maintenance

Green building measures cannot achieve their goals unless they work as intended. Building commissioning includes testing and adjusting the mechanical, electrical, and plumbing systems to ensure that all equipment meets design criteria. It also includes instructing the staff on the operation and maintenance of equipment.

Over time, building performance can be assured through measurement, adjustment, and upgrading. Proper maintenance ensures that a building continues to perform as designed and commissioned.

7) Steps to Ensure Success

Establishing a vision that embraces sustainable principles and an integrated design approach.

Development of a clear statement of the project’s vision, goals, design criteria, and priorities.
Developing a project budget that covers green building measures and allocating contingencies for additional research and analysis of specific options.

Seeking advice of a design professional with green building experience.

Developing a project schedule that allows for systems testing and commissioning.

Developing contract plans and specifications to ensure that the building design is at a suitable level of building performance.

Creating effective incentives and oversight.

4. International Framework and Assessment Tools

A number of organisations have developed standards, codes and rating systems that let government regulators, building professionals and consumers embrace green building with confidence. In some cases, codes are written so local governments can adopt them as bylaws to reduce the local environmental impact of buildings.

Green building codes and standards, such as the International Code Council’s draft International Green Construction Code, are sets of rules created by standards development organisations that establish minimum requirements for elements of green building such as materials or heating and cooling.

Green building rating systems such as BREEAM (United Kingdom), LEED (United States and Canada), and CASBEE (Japan) help consumers determine a structure’s level of environmental performance. They award credits for optional building features that support green design in categories such as location and maintenance of building site, conservation of water, energy, and building materials, and occupant comfort and health. The number of credits generally determines the level of achievement.

Some of the major building environmental assessment framework include:

1) IPCC - The Intergovernmental Panel on Climate Change (IPCC) is the leading international body for the assessment of climate change established by UNEP (United Nations Environmental Programme) and WMO (World Meteorological Organisation). It is an intergovernmental body. It is open to all member countries of the United Nations (UN) and WMO as the UN General Assembly endorsed the action by WMO and UNEP in jointly establishing the IPCC.

Currently 194 countries are members of the IPCC. Governments participate in the review process and the plenary Sessions, where main decisions about the IPCC work programme are taken and reports are accepted, adopted and approved. The IPCC Bureau Members, including the Chair, are also elected during the plenary Sessions. Because of its scientific and intergovernmental nature, the IPCC embodies a unique opportunity to provide rigorous and balanced scientific information to decision makers. By endorsing the IPCC reports, governments acknowledge the authority of their scientific content. The work of the organisation is therefore policy-relevant and yet policy-neutral, never policy-prescriptive. The aim is to provide a clear scientific view on the current state of knowledge in climate change and its potential environmental and socio-economic impacts.
The IPCC is a scientific body. It reviews and assesses the most recent scientific, technical and socio-economic information produced worldwide relevant to the understanding of climate change. It does not conduct any research nor does it monitor climate related data or parameters. Thousands of scientists from all over the world contribute to the work of the IPCC on a voluntary basis. Review is an essential part of the IPCC process, to ensure an objective and complete assessment of current information.

The IPCC’s Fourth Assessment Report on Climate Change in 2007 is the fourth IPCC report in a series to assess scientific, technical and socio-economic information concerning climate change, its potential effects and options for adaptation and mitigation. It talks about certain standards in sustainable construction and design.

2) GHG Indicator- The Greenhouse Gas Indicator or GHG indicator is an indicator set by the UNEP Guidelines for Calculating Greenhouse Gas Emissions for Businesses and Non-Commercial Organisations. It is aimed towards helping organisations in estimating and reporting their GHG emissions, and so stimulate action on climate change. The Guidelines provide a method for converting information on fuel and energy use readily obtainable by companies to estimated GHG emissions. The Guidelines provide a step-by-step approach based on easy to use worksheets. The Indicator can be applied at different levels of a company regardless of size or location, as well as government agencies, NGOs, and other entities interested in estimating their GHG emissions.

3) Sustainable Buildings and Climate Initiative, UNEP - Enables national and local authorities to review current policy settings affecting the support for sustainable buildings practices (if any), and to identify interventions/changes that will generate substantial support to sustainable building practices.

4) Agenda 21 - Agenda 21 is a programme run by the United Nations (UN) related to sustainable development. It is a comprehensive blueprint of action to be taken globally, nationally and locally by organisations of the UN, governments, and major groups in every area in which humans impact on the environment. The number 21 refers to the 21st century.

5) FIDIC’s PSM - The International Federation of Consulting Engineers (FIDIC) Project Sustainability Management Guidelines were created in order to assist project engineers and other stakeholders in setting sustainable development goals for their projects that are recognised and accepted by as being in the interests of society as a whole. The process is also intended to allow the alignment of project goals with local conditions and priorities and to assist those involved in managing projects to measure and verify their progress.

The Project Sustainability Management Guidelines are structured with Themes and Sub-Themes under the three main sustainability headings of Social, Environmental and Economic. For each individual Sub-Theme a core project indicator is defined along with guidance as to the relevance of that issue in the context of an individual project.

The Sustainability Reporting Framework provides guidance for organisations to use as the basis for disclosure about their sustainability performance, and also provides stakeholders a universally applicable, comparable framework in which to understand
disclosed information. The Reporting Framework contains the core product of the Sustainability Reporting Guidelines, as well as Protocols and Sector Supplements. The Guidelines are used as the basis for all reporting. They are the foundation upon which all other reporting guidance is based, and outline core content for reporting that is broadly relevant to all organisations regardless of size, sector, or location. The Guidelines contain principles and guidance as well as standard disclosures - including indicators - to outline a disclosure framework that organisations can voluntarily, exibly, and incrementally, adopt.

Protocols underpin each indicator in the Guidelines and include definitions for key terms in the indicator, compilation methodologies, intended scope of the indicator, and other technical references. Sector Supplements respond to the limits of a one-size-its-all approach. Sector Supplements complement the use of the core Guidelines by capturing the unique set of sustainability issues faced by different sectors such as mining, automotive, banking, public agencies and others.

6) **IPD Environment Code** - The IPD Environment Code was launched in February 2008. The Code is intended as a good practice global standard for measuring the environmental performance of corporate buildings. Its aim is to accurately measure and manage the environmental impacts of corporate buildings and enable property executives to generate high quality, comparable performance information about their buildings anywhere in the world. The Code covers a wide range of building types (from offices to airports) and aims to inform and support the following:

- Creating an environmental strategy
- Inputting to real estate strategy
- Communicating a commitment to environmental improvement
- Creating performance targets
- Environmental improvement plans
- Performance assessment and measurement
- Life cycle assessments
- Acquisition and disposal of buildings
- Supplier management
- Information systems and data population
- Compliance with regulations
- Team and personal objectives

IPD estimate that it will take approximately three years to gather significant data to develop a robust set of baseline data that could be used across a typical corporate estate.
7) ISO 21931:2006, Sustainability in building construction — Framework for methods of assessment for environmental performance of construction works — Part 1: Buildings - The framework is intended to provide a general framework for improving the quality and comparability of methods for assessing the environmental performance of buildings. It identifies and describes issues to be taken into account when using methods for the assessment of environmental performance for new or existing building properties in the design, construction, operation, refurbishment and deconstruction stages. It is not an assessment system in itself but is intended be used in conjunction with, and following the principles set out in, the ISO 14000 series of standards.

Apart from the major building environmental assessment framework, most countries follow their own particular assessment tools. These tools normally include assessment protocols, rating systems and guidance for green building design, operation and management. Here is a comprehensive list of different assessment tools followed in various countries:

- Australia: Nabers and Green Star
- Brazil: AQUA and LEED Brasil
- Canada: LEED Canada / Green Globes / Built Green Canada
- China: GBAS
- Finland: PromisE
- France: HQE
- Germany: DGNB / CEPHEUS
- Hong Kong: HKBEAM
- India: Indian Green Building Council (IGBC)
- Indonesia: Green Building Council Indonesia (GBCI) / Greenship
- Italy: Protocollo Itaca / Green Building Council Italia
- Japan: CASBEE
- Korea: KGBC
- Malaysia: GBI Malaysia
- Mexico: LEED Mexico
- Netherlands: BREEAM Netherlands
- New Zealand: Green Star NZ
- Philippines: BERDE / Philippin e Green Building Council
- Portugal: Lider A
- Republic of China (Taiwan): Green Building Label
- Singapore: Green Mark
- South Africa: Green Star SA
- Spain: VERDE
- Switzerland: Minergie

India has rich traditions and history in holistic strategies for buildings and construction. Despite this the sustainable buildings agenda currently receives limited attention in India. While there are some local initiatives promoting sustainable buildings which include research, pilot or advocacy projects, there is no coordinated approach to address the wider sustainable buildings agenda in India.

UNEP’s Sustainable Buildings and Construction Initiative (SBCI) in association with TERI and Marrakech Task Force are working together to establish knowledge on the base-line emissions from buildings in India, highlight priority issues and opportunities for sustainable buildings and identify a network of experts that can contribute to the aims of Sustainable United Nations (SUN) and SBCI. The intent of this roundtable is to get a consensus and useful inputs from the various stakeholders and participants of this roundtable on the above issues.

Existing Building Scenario in India - India, the seventh largest country in the world, is a leading economy and home to over one billion people living in various climatic zones. The country’s economy has been growing at a fast pace ever since the process of economic reforms started in 1991. Construction plays a very important role in its economy contributing on an average 6.5% of the GDP.

Commercial and residential sectors continue to be a major market for the construction industry. The sectors consume a lot of energy throughout the life cycle of buildings thus becoming a major contributor to greenhouse gas emissions.

Given the spiraling urban growth, the number of buildings, energy consumption and the resultant carbon emissions is on a rise in the country. As per the 17th Electrical Power Survey (EPS) of the Central Electricity Authority, the electricity demand is likely to increase by 39.7% in 2011-12 as compared to 2006-07, by another 43.7% in 2016-17 as compared to 2011-12 and by yet another 37.5% in 2021-22 as compared to 2016-17. With a near consistent 8% rise in annual energy consumption in the residential and commercial sectors, building energy consumption has seen a increase from 14% in the 1970s to nearly 33% in 2004-05. Electricity use in both residential and commercial sectors is primarily for lighting, space conditioning, refrigeration, appliances and water heating.

The rural residential sector continues to rely heavily on traditional non-commercial fuels such as fuel wood and dung. As per 2001 Census of India, only 43.5% of rural households have an electricity connection and more than 85% of electrified rural households use it for lighting purpose only. The urban sector depends heavily on commercial fuels for its energy needs. It is estimated that on an average in a typical commercial building in India, around 60% of the total electricity is consumed for lighting, 32% for space conditioning, and less than 8% for refrigeration. Whereas in a typical residential building, around 28% of the total electricity is consumed for lighting, 45% for space conditioning, 13% for refrigeration, 4% for televisions and 10% for other appliances in urban sector.4

The average electricity consumption for space conditioning and lighting in India is around 80 kWh/m²/annum and 160 kWh/m²/annum for residential and commercial buildings respectively. Under a Business As Usual (BAU) scenario and based on a 10% annual increase in new built-up area, the projected annual increase in electricity demand in commercial and residential buildings would be 5.4 billion kWh.

Energy consumption in Indian buildings is expected to increase substantially due to economic growth, construction growth and human development. The demand for energy to run appliances such as TVs, air conditioning and heating units, refrigerators and mobile phone chargers will increase substantially as living standards rise in India.

Also the growth in commercial sector and the shift from rural to urban living will continue to take place. This will result in a substantial increase in resultant emissions from the buildings sector alone and need concerted efforts to bring down the energy consumption by buildings through various measures.

In India there exists two types of certifications/assessments:

1) LEED INDIA along with other IGBC rating systems administered by the Indian Green Building Council.

2) Green Rating for Integrated Habitat Assessment, or GRIHA conceived by The Energy Resources Institute and developed jointly with the Ministry of New and Renewable Energy, Government of India.

An important development in the Indian building industry has been the development of the ECBC (Energy Conservation of Building Code) brought out by the Ministry of Power, India. This standard provides guidelines for construction of energy efficient buildings in India and is similar to the ASHRAE standard 90.1. There are talks of making the ECBC standard mandatory for all buildings within the next 5 years.

Policy Initiatives at National Level - India has a number of policy initiatives to mainstream energy efficiency and green buildings as control and regulatory instruments, including appliance standards, mandatory labelling and certification, energy efficiency obligations, and utility DSM(Demand side management) programmes; economic and market-based instruments; fiscal instruments and incentives; support, information and voluntary action.

4 All Statistics are based on CMIE, 2001, Economic Intelligence Service Report 2001, Centre for monitoring Indian economy, Mumbai, India.
Some of these are briefly explained in the following section:

1) **Energy Conservation Building Code, 2007** - The Energy Conservation Act, 2001 provides for the establishment of state energy conservation agencies to plan and execute programmes. The Act led to the formation of Bureau of Energy Efficiency (BEE) that formulated the Energy Conservation Building Code (ECBC). It targets building energy efficiency and was introduced in the year 2007. This is the nation’s first building energy code and aims to have a major impact on energy-efficiency in buildings. It is a voluntary code for all buildings with a connected load of 500 kW and most likely to become a mandatory code. It covers minimum requirements for building envelope performance as well as for mechanical systems and equipment, including heating, ventilation and air conditioning (HVAC) system, interior and exterior lighting system, service hot water, electrical power and motors in order to achieve energy efficiency in different climatic zones of India.

2) **Environmental Impact Assessment (EIA) and Clearance** - This is a mandatory requirement for all buildings with a built up area above 20,000 sq. m. and such projects have to be apprised by the MoEF’s Environmental Appraisal Committees (EACs) and the State Environmental Appraisal Committees (SEACs).

3) The Ministry of New and Renewable Energy has initiated several programmes focusing on the utilisation of renewable energy sources in buildings.

4) **Sustainable Habitat Mission (SHM)** - The SHM under the National Action Plan on Climate Change was launched by the honourable Prime Minister, Mr. Manmohan Singh on June 30, 2008. It encompasses a broad and extensive range of measures and focuses on eight missions, which will be pursued as key components of the strategy for sustainable development. These include missions on solar energy, enhanced energy efficiency, sustainable habitat, conserving water, sustaining the Himalayan ecosystem, creating a “Green India”, sustainable agriculture and, finally, establishing a strategic knowledge platform for climate change. For the habitat mission, the strategies proposed aim at promoting efficiency in residential and commercial sector through various measures such as, change in building bye laws, capacity building, research and development in new technologies, education and awareness, etc., management of municipal solid wastes, and promotion of urban public transport.

5) **Energy labelling of appliances** BEE has several programmes to set labels and energy efficient standards for refrigerators, air conditioners, motors and other appliances. Labelled products have been in the market since 2006. In a move to manage energy demands, BEE has made star rating for energy efficiency mandatory for a host of electrical appliances from September 20, 2008. The implementation of this mandate is yet to be seen.

**Policy Initiatives at Local/City level** - A city has a final set of building guidelines in the form of building bye laws which are finally implemented at town and city level by the respective Development Authorities and Municipal Corporations/Municipalities. These byelaws however, currently have not been able to integrate the ECBC provisions and other sustainability parameters.
Rating systems - Building rating systems are a popular tool to bring momentum in achieving energy efficiency and sustainability in buildings. The country has currently two rating systems namely, LEED and GRIHA.

a) Leadership in Energy and Environmental Design (LEED) : The Leadership in Energy and Environmental Design (LEED) Green Building Rating System, developed and managed by the USGBC, is the most widely used rating system in North America. Buildings are given ratings of platinum, gold, silver, or “certified”, based on green building attributes. LEED is evolving rapidly; in the United States, at least nine types of specific programmes exist, including those for new commercial construction and major renovation projects, existing building operation and maintenance, commercial interiors, homes, schools, neighbourhoods and retail.

USGBC is also developing LEED for Healthcare, and LEED for Labs. The Indian Green Building Council (IGBC) founded by the collaboration between the Confederation of Indian Industry (CII) and the private manufacturer Godrej, has taken steps to promote the green building concept in India. Currently, IGBC is facilitating the LEED rating of the U.S. Green Building Council in India. LEED-India was launched in 2001 and rates buildings on environmental performance and energy efficiency during the design, construction and operation stages.

b) Green Rating for Integrated Habitat Assessment (GRIHA): The Ministry of New and Renewable Energy have adopted a national rating system- GRIHA which was developed by The Energy and Resources Institute (TERI). It is an indigenously developed rating system completely tuned to the climatic variations, architectural practices, existing practices of construction and attempting to revive the passive architecture. The GRIHA rating system takes into account the provisions of the National Building Code 2005, the Energy Conservation Building Code 2007 announced by BEE and other IS codes. This was developed specifically aimed at non-air conditioned or partially air conditioned buildings.

GRIHA has been developed to rate commercial, institutional and residential buildings in India emphasizing national environmental concerns, regional climatic conditions and indigenous solutions. GRIHA stresses passive solar techniques for optimising visual and thermal comfort indoors and encourages the use of refrigeration-based and energy-demanding air conditioning systems only in cases of extreme thermal discomfort.

There has been an upcoming trend especially in the commercial sector to look at sustainability aspects and of lately a number of such projects have gone in for either of the above prevalent building assessment system (rating system). As an indication, there are some 375 registered green building projects in India with LEED amounting to 260 million sq. ft. and 28 registered green building projects for GRIHA amounting to 1.3 million sq. ft.

6. Examples of Green Buildings in India

Accepted definitions of green buildings describe them as structures that ensure efficient use of materials, water, energy and other resources without depletion of nature and minimal generation of non-degradable waste. The concept of green buildings was prevalent in India from the time of our ancestors who revered the five elements of nature. Today,
India can boast of Leadership in Energy and Environmental Design (LEED)-certified green buildings ranging from residential complexes, exhibition centers, hospitals and educational institutions to laboratories, IT parks, airports, government buildings and corporate offices.

Let us now examine a few illustrations. The following is a list of some green buildings in India based on the LEED India ratings:

1) **Suzlon Energy Limited, Pune** - The building of Suzlon Energy Limited in Pune is also known as “One Earth”. It can house 2,300 people and was constructed at a lower cost compared to other eco-friendly buildings of the same size. The building is rated ‘Platinum’ by LEED and certified as an eco-friendly building by the Green Building Council. Built to perfection on an area of 41,000 square meters (10.13 acres), One Earth can be counted as among the largest green building projects in India and is living proof that our world can be replenished with a little green effort, everyday.

2) **Biodiversity Conservation India Ltd (BCIL), Bangalore** - As a green builder who strives for the conservation of diversity in vegetation, forests, culture and urban lifestyles, BCIL has created some of the most energy-efficient residential homes India has ever set eyes upon. The company’s TZed homes in Whitefield, Bangalore has been certified as the first residential apartment in the world to be rated ‘Platinum’ under LEED. TZed, which means “Towards Zero Energy Development” is a 2,49,000 sq.ft. green project spread across 5.5 acres and is designed to reduce lighting and energy by nearly 70 per cent. No home at BCIL TZed Homes uses incandescent lamps, halogens and fluorescent tubelights.
3) Olympia Technology Park, Chennai - The world’s largest LEED ‘Gold’ rated green building is right here in India. Built on an area of 1.8 million sq. ft., this futuristic masterpiece features three mighty towers on 8.4 acre greenery. It is constructed with energy saving technology, autoclaved blocks containing 30 per cent flyash, wooden door-frames made from compressed sawdust and low VOC (Volatile Organic Compounds) paints. Olympia’s green construction is compatible with the needs of an IT company and also ensures efficient space.

4) ITC Green Centre, Gurgaon - Renowned as one of the early adopters of the green building movement in India, the ITC Green Centre is still considered a benchmark for green buildings. It was the first ‘Platinum’ rated building in India and has endeavoured to adopt green practices that go beyond recycled waste and day-lit offices. Within a built-in area of 180,000 sq.ft., the building features alternative transportation facilities, storm water management system, solar thermal technology, reflective high-albedo roof paint, minimal exterior lighting, separate smoking rooms with exhaust system and zero-water discharge. More than 10% of the building materials are refurbished from other sites and 40% are from within 500 miles of the project site.

5) The Druk White Lotus School, Ladakh - In this desert landscape of severe climatic conditions, 3,500 meters above sea level, was born a modest school that is adjudged as an outstanding example of sustainable, green, cost effective building development. This multi-award winning structure is the recipient of the Best Asian Building, Best
Education Building and Best Green Building awards. It combines the best of traditional Ladakhi architecture with 21st century engineering excellence and is built with traditional materials such as locally excavated stone, mud bricks, timber and grass. Not just modern construction materials but also traditional materials like traditional mud brick masonry is used internally to provide increased thermal performance and durability.

6) La Cuisine Solaire, Auroville - One of the most innovative green buildings in the country is the solar kitchen at Auroville that best demonstrates the use of solar energy to produce steam. This 1700 sq. m. kitchen is named thus because of the huge 15 diameter solar bowl that has been fixed at the top of the structure to harvest solar energy. On a clear day, this green structure can generate enough steam at a temperature of 150°C that can be used to cook meals for 1000 people, three times a day. This building puts to use appropriate technologies and passive solar concepts to achieve energy-efficiency.

7) Doon School, Dehradun - Authorities can rightfully claim that this establishment is one of India's first green school campuses that opted for recycling measures and successfully achieved cent per cent self-sufficiency in energy, water and organic fertiliser. Several old building blocks that were part of the 69 acre school were redesigned and solar thermal systems, waste management processes as well as biomass gasification systems were introduced as part of its green initiatives. Doon school
drastically reduced the need for artificial heating/cooling air conditioning through solar thermal systems and cross-ventilation.

8) **Raintree Hotels, Chennai** - Here is an eco-sensitive hotel for the eco-savvy traveler. The entire chain of Raintree business hotels across Chennai city are the first eco-sensitive hotels in South India. Everything about this hospitality range is green: right from the rubber wood, bamboo and medium-density fiber used for construction down to the Portland Pozzalana cement containing 15 to 20 per cent fly ash. The George Fisher concealed cistern installed at the hotel controls the water used in toilet flushes and the sewage treatment plant recycles water for use in air conditioners.

9) **Rajiv Gandhi International Airport, Hyderabad** - India’s first Greenfield airport is undeniably among the top 10 green buildings in India and the first airport in Asia to be awarded the LEED ‘Silver’ rating certification by US Green Building Council. Featuring 100,005 sq. m. of glass encased terminal, this green building ensures optimal use of natural light and minimal wastage of electricity or energy consumption. Yet another of its green features includes the recycling of treated wastewater for landscaping, air conditioning and flushing requirements. This greenfield airport has been built at a cost of Rs 2,478 crore.
10) **Nokia, Gurgaon** - Among India's most sustainable buildings is the corporate office of Nokia in Gurgaon which has been granted accreditation as one of the world's leading green buildings by the U.S. Green Building Council (USGBC). This is the first time that a commercial interior fit-out project in India is being awarded the Green Building Award and prestigious LEED ‘Gold’ rating. What makes this green office stand out from the rest is its smart lighting and ventilation systems, high-efficiency chillers, high-performance double glazing, heat recovery wheel, green guard certified furniture and online CO₂ monitoring system. The first Nokia facility to receive LEED Gold Certification was the China campus in Beijing.

### 7. Conclusion

India’s Green Building Code, still evolving.

Material and design improvisations continue to be made in the way buildings are constructed in our country. However, the laws that bind the Green Building Code in India are more voluntary than specific.

While the void that has been created in the absence of this specificity is filled by accreditations offered by various organisations, a detailed national code is much awaited.

The recent acclivity witnessed in energy costs, has had an increasing number of countries, states and cities adopting policies and implementing laws that encourage or require new construction and existing buildings to be energy-efficient. Many of these make it mandatory to meet the terms set down by their green building councils; a few others offer incentives to commercial builders, including tax benefits and real quick permits.
The National Building Code (NBC), designed by the Bureau of Indian Standards (BIS) is limited to offering basic and general guidelines for efficient energy usage. No limits have been set on performance and consumption. The fact that the NBC was amended in 2005 after 18 years, is reflective of its limitations. ECBC lists out features that affect the energy performance of buildings, without addressing issues of water consumption and resources reuse.

**Voluntary laws** - While it is true that the green building laws and codes established in India are voluntary in the absence of an explicit nationalised green building code, there are several accredited certification systems that have been instrumental in introducing green building regulations and development modules in the country. However, with as many as 57 countries the world over, following the green building indicators established by the US Green Building Council, LEED is the benchmark recognised and accepted by most developers, builders, architects and users for core and shell buildings and for fully furnished buildings. LEED-India in fact sets down standards that have been customised according to Indian conditions in terms of the design, construction and operation of buildings that seek high, yet environment-friendly performance.

**LEED-India** - LEED in India has also been at the receiving end of some faultfinding. It has been criticised for including concepts that are specifically western, especially in terms of air-conditioning usage and temperature control. This in turn has resulted in several changes being incorporated in the LEED India rating system, which is constantly being amended to address Indian environment and climate conditions and sustainability issues for buildings.

Site development, water resource utilisation, energy, materials selection and indoor environment are the key areas that have been focussed upon while amending the system.

IGBC is attempting to indigenise LEED according to the environmental conditions prevalent in India. Together with IGBC Green Homes rating, which is perhaps the first rating programme exclusively created for Indian homes, and other systems such as TERI GRIHA and Eco Housing, it offers developers and home owners, the support they require to upgrade the performance of their residential complexes.

The basic prerequisites for green buildings are:

- Climate-based layouts and designs to minimise energy consumption
- Waste water treatment and recycling with zero discharge to outside
- Fly ash blocks can be used for walls and slabs. This will maximise use of recycled material.
- Maximise natural lighting and ensure optimum indoor air quality

Green building movement, though in its nascent stage in India, has already put the country ahead of some powerful economies. For new construction, we have already left behind Australia, one of the prominent countries with vast green building mass, and we are close behind the USA. This has been made possible by some very prestigious commercial projects developed by Indian Construction Industry.
UNIT 2
URBAN TRANSPORTATION SYSTEM

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1. Introduction

A well known and co-ordinated system of transport plays an important role in the sustained economic growth of a country. The present transport system of India comprises several modes of transport including rail, road, coastal shipping, air transport, etc. Transportation in India has recorded a substantial growth over the years both in spread of network and in output of the system. Urban traffic management system is an important component which can properly control and guide the distribution of traffic flows on roads, and can help improve the urban environment. Even the urban transportation infrastructure in different cities is at the same level, the capacity of urban road systems may vary greatly with different traffic management systems.

Traffic management system then becomes the key factor to determine the level of transportation efficiency and the relationship between transportation demand and supply. The Ministry of Shipping, Road Transport and Highways is responsible for the formation and implementation of policies and programmes for the development of various modes of transport save the railways and the civil aviation. The Railways in India provide the principal mode of transportation for freight and passengers. It brings together people from the farthest corners of the country and makes possible the conduct of business, sightseeing, pilgrimage and education. India has one of the largest road networks in the world, aggregating to about 33 lakh kilometers at present. Shipping plays an important role in the transport sector of India’s economy. Approximately, 90 per cent of the country’s trade by volume (70 per cent in terms of value) is moved by sea. India has the largest merchant shipping fleet among the developing countries and ranks 20th amongst the countries with the largest cargo carrying fleet with 8.83 million GT as on 01.06.2008 and the average of the fleet being 18 years. The coastline of India is dotted with 12 Major Ports and about 200 Non-major Ports. The Major Ports are under the purview of the central while the Non-major Ports come under the jurisdiction of the respective State Governments. The Ministry of Civil Aviation is responsible for the formulation of national policies and programmes for development and regulation of civil aviation and for devising and implementing schemes for orderly growth and expansion of civil air transport. India has about 14,500 km of navigable waterways which comprise rivers, canals, backwaters, creeks, etc.
Cities play a vital role in promoting economic growth and prosperity. The development of cities largely depends upon their physical, social and institutional infrastructure. In this context, the importance of intra urban transportation is paramount. Indian cities cannot afford to cater only to private cars and two-wheelers and there has to be a general recognition that policy should be designed in such a way that it reduces the need to travel by personalised modes and boosts public transport system. This requires both an increase in quantity as well as quality of public transport and effective use of demand as well as supply-side management measures.

The establishment of State Transport Undertakings (STUs) in India in the 1960s and 1970s did an enormous service in linking towns and villages across the country, particularly in the western and southern parts. The importance of STUs lies in the fact that, unlike in most other developing countries, one can connect to almost every village in India. Urban areas in India, which include a wide range of megacities, cities and towns, are not all that fortunate in terms of intra city transportation. As far as the public transport system in Indian cities is concerned, dedicated city bus services are known to operate in 17 cities only and rail transit exists only in 4 out of 35 cities with population in excess of one million. Transport demand in most Indian cities has increased substantially, due to increases in population as a result of both natural increase and migration from rural areas and smaller towns. Availability of motorised transport increases in household income, and increases in commercial and industrial activities have further added to transport demand. In many cases, demand has outstripped road capacity. Greater congestion and delays are widespread in Indian cities and indicate the seriousness of transport problems. A high level of pollution is another undesirable feature of overloaded streets. The transport crisis also takes a human toll. Statistics indicate that traffic accidents are a primary cause of accidental deaths in Indian cities. The main reasons for these problems are the prevailing imbalance in model split, inadequate transport infrastructure, and its suboptimal use. Public transport systems have not been able to keep pace with the rapid and substantial increases in demand over the past few decades. Bus services in particular have deteriorated, and their relative output has been further reduced as passengers have turned to personalised modes and intermediate public transport. According to statistics provided by the Ministry of Road Transport and Highways, Government of India, the annual rate of growth of motor vehicle population in India has been about 10 per cent during the last decade. The basic problem is not the number of vehicles in the country but their concentration in a few selected cities, particularly in metropolitan cities. It is alarming to note that 32 per cent of these vehicles are plying in metropolitan cities alone, which constitute about 11 per cent of the total population. During the year 2000, more than 6.2 million vehicles were plying in megacities (Mumbai, Delhi, Kolkata and Chennai) alone, which constitute more than 12.7 per cent of all motor vehicles in the country. Interestingly, Delhi, which contains 1.4 per cent of the Indian population, accounts for nearly 7 per cent of all motor vehicles in India.

2. Policy Initiatives

Transport being essentially a derived activity its conceptualisation and articulation depends upon a variety of social and economic issues and longer term goals. India has however attempted twice to evolve a transport policy: the first in 1966 when the dreams of independence were still alive and the second in 1980 under the shadow of zooming oil prices. In a typically oriental fashion, on both occasions, the policies were accepted in
toto by the government and subsequently subjected to studied neglect. These changes have exacerbated the demand for transport - a demand that many Indian cities have not been able to meet. The main reason for this is the prevailing imbalance in model split besides inadequate transport infrastructure and its sub-optimal use. Given the current urban transport scenario in India, transport policy should aim at improving the economic efficiency of cities and well-being of urban inhabitants. Adequate transport policy should assist in alleviating endemic traffic congestion which causes significant disruption to business and commercial activities. Furthermore, policy should aim at reducing social costs of accidents and pollution.

Urban transportation is the single most important component instrumental in shaping urban development and urban living. While urban areas may be viewed as engines of growth, urban transport is, figuratively and literally, the wheel of that engine. The test of urban governance depends upon the quality of life the city or town offers. Since transport is one of the prime determinants of quality of life, it is for the government to articulate the need for mobility and facilitate it through an appropriate mechanism. In fact, the efficiency of cities greatly depends on the development of transport systems, as urban transport is a catalyst for overall development. However, the cities in India suffer from the absence of a cogent urban transport policy. Urban transportation problems in India are manifest in the form of congestion, delay, accidents, energy wastage and pollution. All these have very heavy economic, social and environmental costs. The need of the hour is therefore a sound urban transport policy. The major thrust of such an urban transport policy should include integrated planning, an optimum share between public and private modes, the choice of relevant technology for public transport systems, optimal use and management of available resources, restructuring of monetary and fiscal policy to encourage and promote public transport, and establishment of institutional arrangements, at all levels of governance, particularly at the city level, for planning, development, operation, management and coordination of urban transport systems. Much of the confusion in these matters is due to a lack of professional expertise. There is no transport undertaking in India, which employs qualified transport planners, and the transport planners employed in municipalities and municipal corporations are placed at a hierarchical level where they can have little or no influence.

Although policy measures that involve restraining the use of private cars and two-wheelers are likely to be unpopular, a gradualist approach of progressively introducing restraints on road use, while at the same time improving public transport, is more likely to lead to greater acceptance. It is believed that improved public transport and more efficient management of demand would help to combat the trend away from public transport vehicles towards greater use of personalised modes. The central government should assist local governments for effective implementation of such measures. In fact, there is a pressing need to strengthen institutions in the transport sector. Central government should provide training and technical assistance to local governments to prepare and implement sound policies and programmes. Furthermore, an urban transport policy should encourage the need for developing ‘green’ modes like bicycling, walking, through a provision of pedestrian paths and cycle tracks especially in new development areas of larger cities and small and medium towns which should be integrated with the transport network. The application of Transport System Management (TSM) strategy such as one-way systems, improvement of signals, traffic engineering improvement measures for road network, intersections, bus priority lanes and suitable policies and development of intermediate
passenger transport as a short-term measure should be introduced in all cities especially in metropolitan cities so that the existing road capacity and road user safety is increased. Road infrastructure improvement measures like new road alignments, a hierarchy of roads, a provision of service roads, by-passes, ring roads, bus bays, wide medians, intersection improvements, construction and repair of footpaths and roads, removal of encroachments, good surface drainage etc. should also be introduced at least in metropolitan cities. These can be considered as short- and medium-term measures. Very old vehicles in the city should be phased out and lead free fuel for all vehicles should be introduced as soon as possible.

Besides short- and medium-term measures, there is a need to have long-term measures as well, involving technology upgrades and introduction of a high speed, high capacity public transport system particularly along high-density traffic corridors. Use of electric traction should be encouraged as far as possible. One should note that capital-intensive projects should be considered if and only if it is absolutely necessary. In many cases, instead of building underground railways or elevated highways, the government would have done better to have increased the capacity of existing bus services through bus priority measures, such as exclusive bus ways and better road access. In some cases, of course, capital-intensive investments, such as elevated highways or rapid rail systems, may be the best approach. However, there should be careful appraisal of all capital-intensive projects before implementing them. In addition, there should be a determined effort to develop alternative pollution free fuels in the long run. Caution should be exercised in building flyovers.

In a nutshell, transport strategy should support the following objectives:

- Provide and promote sustainable high quality links for people, goods, and services to, from and within the city to benefit economic growth, and the urban fabric and environmental quality of city;
- Improve the efficiency, effectiveness, and reliability of city’s transport systems;
- Integrate transport, spatial and economic development policies, to ensure sustainable access for people and goods;
- Planning development in a way which reduces the need to travel by personalised modes and increase of public transport system;
- Reduction of consumption of scarce energy resources and pollution for ensuring a healthy living environment;
- Improvement of public transport system and its efficiency;
- Improve travel choice and quality;
- Promote transport services and patterns of movement that will contribute to improvements in air quality, reduction in greenhouse gas emissions, and enable visual amenity;
- Optimisation of existing transport infrastructure and give precedence to low cost and affordable technology, at least as a short-term measure, especially bus technology;
- Promote the health of the people by encouraging more walking and cycling; and
- Ensure that the development of the transport system contributes to the protection and enhancement of the natural to built environment.
Under JNNSRM, the government of India has identified 63 cities for which it will provide assistance in upgrading its road infrastructure. Detailed guidelines have been provided to ensure that public transport gets priority in these cities. For getting approval for transport projects, the guidelines recommend that the transport infrastructure improvement schemes are in compliance with the NUTP (National Urban Transport Policy). Since NUTP’s focus is public transport, pedestrians and bicycles, cities are modifying the earlier road expansion projects to Bus Rapid Transit (BRT) and bicycle-inclusive plans. BRT and bicycle-inclusive plans have been approved by the central government for five cities and another five cities are at different stages of preparation. It seems that pedestrian and bicycle facilities are not the focus of these projects.

India is poised for rapid economic growth. Such future growth will largely come from the secondary and tertiary sectors of the economy, i.e., the industrial and service sectors. Since economic activities in these sectors primarily take place in urban areas, the state of our towns and cities is crucial to India’s future growth.

Further, India’s urban population is currently around 30% of its total population.

Experience across the world has been that as economies grow, rapid urbanisation takes this proportion to over 60% before it begins to stabilise. As such, it is projected that India’s urban population would grow to about 473 million in 2021 and 820 million by 2051, as against only 285 million in 2001. Hence, cities must not only meet the mobility needs of the current population but also provide for the needs of those yet to join the urban population.

In this context, the Government of India has launched the National Urban Renewal Mission (NURM) that inter-alia seeks to bring about comprehensive improvements in urban infrastructure, committing substantial funds for this purpose and requiring a series of reforms that would make the investments sustainable.

For urban areas to be able to support the required level of economic activity, they must provide for the easy and sustainable flow of goods and people. Unfortunately, however, such flow of goods and people has been facing several problems. Most prominent among them have been the following:

The cost of travel, especially for the poor, has increased considerably. This is largely because the use of cheaper non-motorised modes like cycling and walking has become extremely risky, since these modes have to share the same right of way with motorised modes. Further, with population growth, cities have tended to sprawl and increased travel distances have made non-motorised modes impossible to use.

This has made access to livelihoods, particularly for the poor, far more difficult. This again has tended to impact the poor more severely as many of those killed or injured tend to be cyclists, pedestrians or pavement dwellers. Increased use of personal vehicles has led to increased air pollution. Unless the above problems are remedied, poor mobility can become a major dampener to economic growth and cause the quality of life to deteriorate. A policy is, therefore, needed on the approach to dealing with this rapidly growing problem as also offer a clear direction and a framework for future action.
Need for a National Policy
Although the responsibility for management of urban areas (and thus urban transport) rests with the State governments, a Central policy is considered necessary as:

♣ Several key agencies that would play an important role in urban transport planning work under the Central government, with no accountability to the State government.
♣ Several Acts and Rules, which have important implications in dealing with urban transport issues, are administered by the Central Government.
♣ A need exists to guide State level action plans within an overall framework.
♣ The launching of the National Urban Road Mission (NURM) has provided a timely platform for providing significant financial support from the Central Government for investments in urban transport infrastructure. As such, this offers an opportunity for a meaningful national policy that would guide central financial assistance towards improving urban mobility.
♣ A need exists to build capacity for urban transport planning as also develop it as a professional practice.
♣ A need exists to take up coordinated capacity building, research and information dissemination to raise the overall level of awareness and skills.

3. Factors Influencing Urban Transportation Efficiency
Management System

To study the factors of transportation efficiency is the first step of evaluating urban transportation efficiency and proposing corresponding counter measures. The impact factors of urban transportation efficiency are mainly divided into four aspects, which are urban land-use pattern, transportation structure, transportation infrastructure and traffic management system.

1) Urban land-use pattern

Urban land-use pattern means the characteristics and intensity of land-use activities. Transportation demand is derived from the producing and living activities of the human being. Therefore under a certain economic level and land-use pattern, the generation/attraction intensity and special distribution of transportation demand have basically been determined. Urban transportation efficiency varies with different land-use patterns greatly. Therefore, in order to improve urban transportation efficiency, it is an essential measure to build a suitable urban land-use pattern, which can decentralise urban functions, balance the distribution of transportation demand, cut down on total traffic volume and relieve traffic congestions in cities.

2) The structure of urban transportation systems

Under a certain land-use pattern, the total capacity of the urban transportation system is basically determined by the composition of different transport modes in the system. Whether the structure of urban transportation system is harmonised with the land-use pattern, will directly impact the balance between transportation demand and supply. Given the total amount of transportation demand and a certain level of
transportation infrastructure in a city, a good transportation structure will most effectively utilise the infrastructure and will help fully realise the functions of urban transportation systems.

3) **Urban transportation infrastructure**

Urban transportation infrastructure mainly includes roads, parking lots, vehicles and transportation terminals. It is the direct carrier of urban transportation demands and the basic input of the capacity of transportation supply. From the viewpoint of the relationship among transportation efficiency, input and output, the operational efficiency of transportation infrastructure is the key factor which will directly influence the urban transportation capacity provided by the system.

4) **Urban traffic management system**

Urban traffic management system is an important component which can properly control and guide the distribution of traffic flows on roads, and can help improve the urban environment. Even the urban transportation infrastructure in different cities is at the same level, the capacity of urban road systems may vary greatly with different traffic management systems.

Therefore, given a certain land-use pattern and transportation structure in a city, traffic management system then becomes the key factor to determine the level of transportation efficiency and the relationship between transportation demand and supply.

4. **Impacts of Urban Transportation System**

If we look at impact, though mobility and accessibility have increased tremendously in the urban areas, there are severe problems such as delay, congestion, accidents, air and noise pollution, energy wastage, etc. Public transport systems have not been able to keep pace with the rapid and substantial increases in demand over the past few decades. Bus services in particular have deteriorated, and their relative output has been further reduced as passengers have turned to personalised modes and intermediate public transport (such as three-wheelers and taxis), adding to traffic congestion which has had its impact on quality as well. It is often thought to be in egalitarian to provide special services such as air-conditioned buses, express buses, and premium or guaranteed seats in return for higher fares. In other words, variety is usually curbed. Experience shows that the public welcomes a wide choice of transport, but despite the clear need for greater variety in public transport, there is a tendency in established monolithic corporations to offer very limited choice. The city cannot afford to cater only to the private cars and two-wheelers and there has to be a general recognition that without public transport cities would be even less viable. Much needs to be done if public transport is to play a significant role in the life of a city. Measures need to be taken in the short-run to enhance the quality of public transport service and to impose constraints on the use of private vehicles in cities. In the long-run, there needs to be effective land use planning and the introduction of new transit systems to keep the city moving. It must not be forgotten that cities are the major contributors to economic growth and movement in and between cities is crucial for improved quality of life.

Transport systems in most of the Indian cities are under the pressure of economic growth on the one hand and under-investment on the other. Resolving this is therefore the highest
priority of urban authorities. An integrated transport strategy, which should be socially, economically, and environmentally acceptable, has to be evolved and implemented. Urban transport plans should especially emphasize public transport systems. As far as public transport systems in Indian cities are concerned, dedicated city bus services are known to operate in 17 cities only and the rail transit exists only in three cities (i.e., Mumbai, Chennai and Kolkata) out of 35 cities with populations in excess of one million. Very few urban bus transport systems in India have been able to keep pace with the very rapid and substantial increases in travel demand of the past few years. Bus services have deteriorated over the years, and their efficiency and quality have further been reduced. As a result, passengers have turned to personalised modes. Considering the financial health of various levels of governments (central, state and local governments) and investment requirement to improve the rail-based mass transport systems, it is evident that bus transport will have to play a more important role in providing the passenger transport services not only in mega cities but also in most of the metropolitan and class I cities in India. Bus transport is favourable over its other counterparts not only for reasons of energy efficiency but also from an environmental point of view. There is a need to maximise its potential by encouraging promotional measures. Government regulation and control have exacerbated the poor operational and financial performance of the monopolies. As costs rise, for example, transport systems come under financial pressure to increase fares, but politicians are under contrary pressure to keep fares at existing levels. Once again, however, politicians will be inclined to yield to pressure from those whose services are threatened and to insist on maintaining money-losing operations.

a) Environmental impact of Urban Transport

Transport sector is the major contributor to air pollution in urban India. Emissions from motor vehicles pollute the air, which, in turn, affects the health of people who are living in the city. The problem of air pollution in Indian cities can be gauged from the fact that more than 2% of the people in the prime of their life (15 to 45 years) die prematurely in Delhi every year due to breathing and heart-related disorders caused by polluted air. The three mega cities (Mumbai, Kolkata and Delhi) of India accounted for 40% of such deaths. There is a direct relationship between transport system and air pollution in a city. Vehicular emissions depend on vehicle-km, vehicle speed, age of vehicle, and of course emission rate of different vehicle categories. One can see that the emission rate, defined as quantity of pollutants emitted per vehicle-km, pertaining to carbon monoxide (CO) and hydrocarbons (HC) are very high for personalised modes (e.g., cars and two-wheelers) and Para transit modes (e.g., three wheelers) in comparison to buses, trucks, and LCVs. With the deteriorating level of mass transport services and the increasing use of personalised motor vehicles, vehicular emission is assuming serious dimensions in most Indian cities. Traditionally, industries have been blamed for causing air pollution. However, this dubious distinction has now gone to automobiles. For example, in Delhi, the average annual emission of SPM is 543 micrograms per cubic meter while the WHO standard is 75. In the case of Kolkata and Mumbai, the corresponding figures are 394 and 226 respectively. If no action is taken, the air quality of large cities in India is likely to deteriorate by a factor of 3 in the next 10 to 15 years.

b) Energy consumption in the transport sector

In general, energy consumed in the urban transport sector is petroleum products, mainly gasoline and High Speed Diesel (HSD). The energy consumption in urban transport
largely depends on the model split as well as the speed of the vehicle. On average, energy consumption per pass-km is the least by bus and the highest by car among different modes of road-based passenger transport. One can see that buses, which carry around 50% of motorised urban passenger traffic, consume far less energy as compared to cars, jeeps and two-wheelers, which carry around 40% of this traffic. On average, a car consumes nearly six times more energy than an average bus, while two-wheelers consume about 2.5 times and three-wheelers 4.7 times more energy. In terms of fuel cost per pass-km, a two-wheeler is 6.8 times, a three-wheeler 7.0 times, and a car is 11.8 times costlier than a bus. Furthermore, a car occupies over 38 times more road space in comparison to a bus to provide the same level of passenger mobility (in terms of pass-kms). The corresponding figures for two- and three-wheelers are 54 and 15 respectively. This shows that bus transportation is not only favourable in terms of environmental consideration but also in terms of energy efficiency and best possible use of scarce road space.

5. Mass Rapid Transit System (MRTS)

In the field of urban transport, Mass Rapid Transit System (MRTS) is an innovation around the globe that can broadly be classified into ‘rail system’ and a ‘bus system’. The rail based MRTS is capital intensive and includes systems like metro, monorail, Light Rapid Transit (LRT) etc.

**Bus System** - The bus based system includes Bus Rapid Transit System, commonly known as BRTS. Bus Rapid Transit System (BRTS), Modern Bus Services (by Government funding or PPP based models) and their supporting infrastructure such as multilevel or underground parking etc.

The BRTS is not a technology but an organised way of operating buses on dedicated corridors with high tech information system. Selection of a particular type of system depends upon many characteristics of the city. The present study has documented BRTS of four cities, namely, Jaipur, Ahmedabad, Pimpri-Chinchwad and Visakhapatnam. Amongst these, Ahmedabad BRTS has been implemented and operating successfully.

Another option is to operate modern and intelligent transport systems enabled buses. As mentioned earlier, the Government of India has funded 15,260 such buses in 61 JNNURM cities as a part of the economic stimulus package.

The operational performance is largely contingent upon financial performance which itself is subject to management efficiency and fare structure. It is expected that the system should initially recover at least its operating cost from its fare box, which is known as a breakeven point. In other words, a good financial performance improves the operational performance of a mass transport system to a greater extent.

A transport system having good operational performance attracts people and the ridership is increased. An increase in ridership means that the commuters, who were travelling by other modes of transport (especially personal vehicles) earlier, have switched over to public mass transport system.

This process not only improves the financial performance of the system but reduces the congestion on roads which occurs due to the operation of personal vehicles. Moreover, if the congestion is reduced, air pollution, noise pollution, wastage of fuel, wastage of time, rate of accidents etc. are also reduced. Thus, the mobility of people increases, which finally affect the economic growth of the country.
Railway System
The Metro Rail System has proved to be the most efficient in terms of energy consumption, space occupancy and numbers transported. Metro rail advantages are;

♣ Hi-capacity carriers - very high volumes of peak hour peak direction trips
♣ Eco-friendly - causes no air pollution, much lesser sound pollution
♣ Low energy consumption - 20% per passenger km in comparison to road-based systems
♣ Greater traffic capacity - carries as much traffic as 7 lanes of bus traffic or 24 lanes of car traffic (either way)
♣ Very low ground space occupation - 2 meters width only for elevated rail
♣ Faster - reduces journey time by 50% to 75%

Case Study - Mumbai and Delhi

Mumbai
Mumbai (till recently called Bombay) was once a city of many small islands. It was used as a trading port first by the Portuguese and later by the English East India Company. It
grew as the British consolidated their power-base in India but it was initially less important than either Calcutta (today's Kolkata) or Madras (Chennai). However, in the second half of the nineteenth century, it went through a big expansion due to the “Cotton Boom” and the opening of the Suez Canal in 1869.

Over time, land reclamations connected the small islands and consolidated them into one large island. Meanwhile, the railways were introduced. The first track in India was laid by the Great Indian Peninsular (GIP) Railway Company between Thane and Bombay; it was inaugurated on April 16, 1853.

The early introduction of the two major railway lines - the Western and the Central Lines, continues to define the urban form and the character of the city to this day.

The first trams were introduced in Mumbai in 1874 and ran between the localities of Parel and Colaba (the trams were later discontinued). Buses made their first appearance in July of 1926. In 1947, there were 242 buses in operation on 23 routes and carried 238,000 passengers per day. Today there are 3380 buses that transport 4.5 million passengers daily on 335 routes. All this has heavily influenced Mumbai’s DNA, ranging from its extremely dense urban form to its relatively egalitarian culture (despite large income disparities). To this day, urban growth into the suburbs has tended to cluster around train stations along the Western, Central and Harbor lines.

Given the above pattern of urban development, Mumbaikars have traditionally preferred to rely on various forms of public transport. 55.5% of people walked to work in 2001, 22% used trains, 14.4% used buses. Only 1.6% used cars and 3.1% used a two-wheeler. These ratios have probably grown in recent years but car ownership in Mumbai is still the lowest amongst large metropolitan cities of India. Planners in Mumbai have recently added another element to their transport system through the Bandra-Worli Sealink Project. At present, the highly congested Mahim Causeway is the only road link connecting the western suburbs to south Mumbai. This project aims to ease this congestion through an 8-lane motorable bridge in the first phase of the proposed West Island Freeway system. The irony is that the project, which opened in mid-2009, is being built exclusively for fast-moving.

Vehicles thus cater to mere 2 per cent of the city’s population with access to private cars. The rail network, meanwhile, has changed little from a century ago. Though metro line has been proposed this will become a reality soon with rapid urbanisation.

**Delhi**

Delhi is an ancient city and has served as an imperial capital under many dynasties. Parts of the present city have been rebuilt many times by various rulers. While the city was built from a defence perspective, display of Mughal grandeur was also a major motivation for its urban design. The centerpiece of the city was the imposing Red Fort which enclosed the palace complex. Shahjahanabad went into decline after it was sacked by the British after the Revolt of 1857 and the last Mughal Emperor was sent into exile in Burma. Political and economic power had already shifted to Calcutta. In the early twentieth century, the colonial government decided to shift the capital back from Calcutta to Delhi. Under the guidance of architect Lutyens’ New Delhi was commissioned to be built to the south of the existing walled city. The core of Lutyens' Delhi was built between 1911 and 1931 and was an unabashed display of Imperial grandeur. Given the then recent invention of the automobile, roads were made wide and the city was deliberately spread out.
It was this city that became the capital of independent India in 1947. Unlike in Mumbai, rail transport was not given much importance in the initial structural development of Delhi. The use of the automobile got embedded in the DNA of Delhi and subsequent expansions were almost always envisaged with road transport in mind. As recently as the late nineties, satellite cities of Gurgaon and Noida were built with only automobiles in mind. The emphasis on roads has translated into Delhi having the highest level of car ownership in India; public transport, too, is dominated by buses. According to the Delhi Economic Survey 2007-2008, there has been an exponential growth in the number of vehicles, which increased from 2.848 million in 1996-97 to 5.232 million in 2006-07 at an annual compound growth rate of 6.06 per cent. This does not include the number of cars in the wider metropolitan area. The survey also quotes the Society of India Automobile Manufacturers to state that Delhi has 85 private cars per 1000 individuals putting the car density in Delhi at 10 times the national average. It notes that the share of buses (which until 2003 catered to 60 per cent of the city’s total transport load) in total number of vehicles has been going down steadily since 2003. The emphasis on roads has translated
Urban Transportation System

into Delhi having the highest level of car ownership in India the car density in Delhi [is] 10 times the national average.

It is interesting that the embedded DNA of a city can sometimes over-rule attempts to change. Take for instance, the failure of the Delhi Ring Railway, a part of the Delhi Suburban Railway services. Conceived during the 1982 Asian Games, the Ring Railway failed because of lack of proper connectivity of stations to other modes transport and less population density in areas of reach. The Ring Rail is now largely defunct. Nonetheless, things are changing. In recent years, the Delhi Metro Rail Corporation (DMRC) has been trying to radically alter this dependency on road transport and attempting to hardwire the city differently. The attempt appears to be succeeding in parts of the city - especially in the dense ring of urban development than now surrounds Lutyen’s Delhi. In addition, the city is also trying to radically change road transport by introducing the Bus Rapid Transport System National Highway 8 that Connects Delhi to Gurgaon Delhi’s BRTS has been a controversial introduction into the city’s transportation mix and has faced severe opposition from private car owners.

Delhi Metro has become the first rail network in the world to get a UN certificate for preventing over 90,000 tones of CO$_2$ from being released into the atmosphere from 2004 to 2007 by adopting regenerative braking systems in the metro trains which help in deducing its power requirement.

Three phase-traction motors installed on them act as generators to produce electrical energy goes back into the Over Head Electricity (OHE) lines. The regenerated energy that is supplied back to the OHE is used by other accelerating trains in the same service line, thus saving overall energy in the system, thus about 30 per cent of electricity requirement is reduced. By the mid-nineties, the boom in car ownership was clearly straining the road network. It was felt that Delhi needed something more than a road-based bus system. To rectify this situation the Government of India and the Government of National Capital Territory of Delhi, in equal partnership set up a company named Delhi Metro Rail Corporation Ltd. (DMRC) on 5th March 1995. The planning for a Metro in Delhi dates back to the 1970s. Actual work towards building the metro, however, only started three years after DMRC was established.

The first phase of the project finished in December, 2005, on budget and nearly three years ahead of schedule. Phase 2 of the network comprises 128 km of route length and 79 stations, and is presently under construction, with the first section opened in June 2008 and a target completion date of 2010. Phase 3 (112 km) and Phase 4 (108.5 km) are planned to be completed by 2015 and 2020 respectively.

With the network spanning 413.8 km by then, Delhi Metro will be larger than London’s Underground (408 km). An average of 500,000 commuters travel underground daily instead of driving their own cars and scooters or packing into buses. The rail investments are yet to achieve its full utilisation as its share of commuter traffic is only a mere 2 per cent. It is, however, expected that once all four phases are complete by 2021, the share of commuter traffic for the entire network will go up to about 25 per cent.

6. Conclusion

Urban transportation system control and guide the distribution of traffic flows on roads, and improve the urban environment, even though mobility and accessibility have increased enormously in the urban areas, there are severe problems such as delay, congestion,
accidents, air and noise pollution, energy wastage, etc. Public transport systems have not been able to keep pace with the rapid and substantial increases in demand over the past few decades. Much needs to be done if public transport is to play a significant role in the life of a city. Transport being essentially a derived activity its conceptualisation and articulation depends upon a variety of social and economic issues and longer term goals. India twice develops a transport policy: the first in 1966 and in 1980. Policy measures that involve restraining the use of private cars and two-wheelers are expected to be not accepted, a gradualist approach of progressively introducing restraints on road use, while at the same time improving public transport, is more likely to lead to greater acceptance.

Under JNNURM, the government of India has identified 63 cities for which it will provide assistance in upgrading its road infrastructure. Since NUTP’s focus is public transport, pedestrians and bicycles, cities are modifying the earlier road expansion projects to Bus Rapid Transit (BRT) and bicycle-inclusive plans. If we look at the land-use pattern, the total capacity of the urban transportation system is basically determined by the composition of different transport modes in the system. Urban transportation infrastructure mainly includes roads, parking lots, vehicles and transportation terminals. More emphasis should be on the mass rapid transit system i.e. rail and road based mass transport system are supposed to be the efficient transport modes to meet the increasing demand.

Urban areas, mega-cities, towns, have grown and are growing. Buses as a mode of public transport have a potential which is yet to be fully exploited. Given the priority that they deserve, buses can ensure safety, act against pollution and promote mobility for the poor and the not so poor.

Transport System Management (TSM) strategy such as one-way systems, improvement of signals, traffic engineering improvement measures for road network, intersections, bus priority lanes, and suitable policies and development of intermediate passenger transport as a short-term measure should be introduced in all cities especially in metropolitan cities so that the existing road capacity and road user safety is increased. Measures need to be taken in the short-run to enhance the quality of public transport service and to impose constraints on the use of private vehicles in cities. In the long-run, there needs to be effective land use planning and the introduction of new transit systems to keep the city moving.

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UNIT 3
CONSERVATION OF HERITAGE BUILDINGS

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1. Introduction

The need of conservation of buildings and areas of heritage significance was recognised world over from very early times, though law institutionalised this around one and a half centuries back in Europe.

The majority of India's architectural heritage and sites are unprotected. They constitute a unique civilisation legacy, as valuable as the monuments legally protected by various governmental and non-governmental agencies. Urbanisation many a times aids in slow and steady erosion. Many unprotected heritage sites are still there, and the manner in which they continue to be kept in use represents the 'living' heritage of India.

This heritage is manifest in both tangible and intangible forms. The buildings and sites, which constitute it, are subject to demolition or unsympathetic interventions. The knowledge of traditional building skills with which it is associated is also in danger of being lost in the absence of patronage and official recognition. Conserving the ‘living’ heritage, therefore, offers the potential to conserve both traditional buildings and traditional ways of building.

This ‘living’ heritage also has symbiotic relationships with the natural environments within which it originally evolved. Understanding this interdependent ecological network and conserving it can make a significant contribution to improving the quality of the environment.

What is Cultural Heritage? UNESCO defines cultural heritage under several main categories:

A) Tangible Heritage
   - Immovable (e.g., traditional buildings, historic city centers and archaeological sites);
   - Movable (e.g., paintings, sculpture, coins and manuscripts);
   - Underwater (e.g., shipwrecks and ancient cities);

B) Intangible Heritage (e.g., oral traditions, performing arts, rituals, knowledge and skills); and

C) Natural Heritage (e.g., natural sites with cultural aspects such as cultural landscapes and physical, biological, or geological formations).
An architectural heritage (including heritage buildings and properties) constitute the ‘tangible heritage’, specifically the immovable tangible heritage. Conserving the unprotected architectural heritage and sites ensures the survival of the country’s sense of place and its very character in a globalising environment. It offers the opportunity not only to conserve the past, but also to define the future. It provides alternate avenues for employment and a parallel market for local building materials and technologies, which needs to be taken into account when resources for development are severely constrained.

Proponents of heritage conservation emphasize its cultural, aesthetic, educational, environmental, social and historical benefits. However, many still regard urban conservation, especially of the urban architectural heritage as a non important factor in economic growths - the development of economic benefits such as jobs, household income, and business profits, are more important. This view is particularly strong in developing countries, where economic growth has priority over heritage values.

Some are optimistic that along with conservation, the reason being, the economy will also grow due to the increase in heritage tourism that in the end brings jobs and businesses. This, however, may lead to the traditional residences and businesses being sold and converted to boutique hotels, souvenir shops, trendy pubs and restaurants, catering to the tourist trade as well as the displacing of local residents who will hence not be able to participate in and benefit from this development, while the old trades, communities, traditions and life styles may be destroyed by this gentrification process.

**Box 1: Importance of Heritage Buildings**

*Why is it important to conserve heritage buildings?*

The objective of conservation is to maintain the significance of the architectural heritage or site. Significance is constituted in both the tangible and intangible forms.

The tangible heritage includes historic buildings of all periods, their setting in the historic precincts of cities and their relationship to the natural environment. It also includes culturally significant modern buildings and towns. The intangible heritage includes the extant culture of traditional building skills and knowledge, rites and rituals, social life and lifestyles of the inhabitants, which together with the tangible heritage constitutes the ‘living’ heritage. Both tangible and intangible heritage, and especially the link between them, should be conserved.

Conservation of architectural heritage and sites must retain meaning for the society in which it exists. This meaning may change over time, but taking it into consideration ensures that conservation will, at all times, have a contemporary logic underpinning its practice. This necessitates viewing conservation as a multi-disciplinary activity.

Where the evidence of the tangible or intangible architectural heritage exists in fragments, it is necessary to conserve it, even in part, as representative of a historic past. Such conservation must ideally be undertaken *in-situ*, but if this is not possible, then it should be relocated to a place where it would be safe for continued contemplation.
Conservation in India is heir not only to Western conservation theories and principles introduced through colonialism and, later, by the adoption of guidelines formulated by UNESCO, ICOMOS and international funding agencies, but also to pre-existing, indigenous knowledge systems and skills of building. These indigenous practices vary regionally and cannot be considered as a single system operating all over India. This necessitates viewing conservation practices as a multi-cultural activity.

While the Western ideology of conservation advocates minimal intervention, India’s indigenous traditions idealise the opposite. Western ideology underpins official and legal conservation practice in India and is appropriate for conserving protected monuments. However, conserving unprotected architectural heritage offers the opportunity to use indigenous practices. This does not imply a hierarchy of either practice or site, but provides a rationale for encouraging indigenous practices and thus keeping them alive. Before undertaking conservation, therefore, it is necessary to identify where one system should be applied and where the other. For this purpose, it is necessary at the outset to make a comprehensive inventory of extant heritage, both tangible and intangible, and separate it into two categories:

i) Buildings and sites protected by ASI, SDA and other government or non-government agencies. Only the official and legal instruments of conservation and internationally accepted principles should be adopted here;

ii) Other listed buildings and sites which, though not protected by ASI, SDA and other government or non-government agencies, possessing heritage value or significance equivalent to that of protected monuments. Here too, the official and legal instruments should be adopted for their conservation.

The remaining listed buildings and sites both modern and historic, including those produced within the last hundred years. Here, the conservation strategy may adopt either the official and legal instruments of conservation or those rooted in indigenous building traditions. Hybrid strategies, inventively combining indigenous and official practices, can also be employed to conserve this heritage category. The decision to adopt indigenous practices should be based on the availability of skilled and knowledgeable raj mistris. In all cases a rationale for the decision taken to adopt one or another system of conservation must be recorded.

The overarching objective for undertaking conservation of unprotected architectural heritage and sites is to establish the efficacy of conservation as a development goal. What to conserve will, therefore, be determined by those strategies of conservation, which accommodate the imperatives of development and the welfare of the community while seeking economically to achieve maximum protection of the significant values of the architectural heritage and site.

2. Meaning and Definition of Heritage Buildings

A Heritage building means a building possessing architectural, aesthetic, historic or cultural values which is declared as heritage building by the Planning Authority/Heritage conservation committee or any other Competent Authority in whose jurisdiction such building is situated. It is a building with architectural significance and traditional values are considered for
their preservation and conservation. These buildings/structures/monuments play an important side in the history of the Region as well as the State in general which requires proper maintenance. Some buildings/structures are in endangered condition; some requires strengthening, while mere maintenance is sufficient for some buildings/structures.

Some other important definitions -

- **Heritage precinct** - “Heritage precinct” means an area comprising heritage building or buildings and precincts thereof or related places that share wholly or partly certain common physical, social, cultural significance worth preservation and conservation.

- **Conservation** - “Conservation” of heritage buildings, structures, areas and precincts of historic or aesthetic, architectural or cultural or environmental significance involves maintenance, preservation, restoration of reconstruction based on requirements.

- **Preservation** - “Preservation” is a process involved in the maintenance necessary in order to maintain the building precinct or artifact in its present state and to prevent and to retard deterioration.

- **Restoration** - “Restoration” is the means necessary to return the fabric to its known earlier state, by means of the removal of accretion or resembling existing components or by the sensitive introduction of compatible materials. For this purpose, an inventory of such buildings upon which the heritage status has been conferred is to be undertaken.

‘Heritage buildings’ and ‘Built Heritage’ -

When we speak of conservation of tangible heritage, we come across two different and confusing terminologies namely, ‘heritage buildings’ and ‘built heritage’.

As we have already seen, any building depicting characteristics of historic, socio-cultural value, striking architectural or artistic significance in respect of style, design, use of construction material etc. However, the next question that arises is that what is the criteria for selection of a **heritage building**.

Building with architectural significance and traditional values are considered for their preservation and conservation. Some buildings/structures are in endangered condition; some requires strengthening, while mere maintenance is sufficient for some buildings/structures. For this purpose, an inventory of such buildings upon which the heritage status has been conferred ought to be undertaken.

**Built heritage**, on the other hand, should be deemed to mean those buildings, artifacts, structures, areas and precincts that are of historic, aesthetic, architectural or cultural significance and should include natural features within such areas or precincts of environmental significance or scenic beauty such as sacred groves, hills, hillocks, water bodies (and the areas adjoining the same), open areas, wooded areas, etc. It must be recognised that the ‘cultural landscape’ around a heritage site is critical for the interpretation of the site and its built heritage and thus is very much its integral part.

The conservation of built heritage is generally perceived to be in the long term interest of society. This can be better understood if categorised under ‘economic’, ‘cultural’, and ‘environmental’, although they are not mutually exclusive and, indeed, they are often interlocked.
Let us now examine some advantages of conserving built heritage -

1) **Using our Building Stock** - Most buildings are capable of beneficial use, whether for their original purpose or for some other use. Buildings and their precincts need to be used in order to survive and such use can be made into an economically viable enterprise.

2) **Stability and Continuity** - In a rapidly changing modern world of relatively short life of buildings, the perception of stability and continuity can create a climate of confidence which can have economically beneficial results.

3) **Economic Regeneration** - The use of conservation as an engine of economic generation is very significant.

4) **Value of Good Environment** - Interesting buildings in good condition are often fundamental components of a good environment that can act both as an indicator of economic health and as a stimulus to economic activity.

5) **Employment and Training** - The maintenance and repair of traditional buildings generates a steady flow of good quality skilled employment and support training for the construction industry.

6) **Education** - As one of the most obvious symbols of national and local culture, historic buildings and areas can have considerable educational value to teachers, tourists and the general populace.

7) **Tourism** - Tourism is fast becoming one of the country’s major industries and historic buildings and areas, are one of the most important raw materials of that industry.

8) **Cultural and Historical Value** - An understanding of contemporary society as a basis for considering the future depends to an extent upon our appreciation of the past and historic buildings. Archaeology can provide primary source material for this.

9) **Aesthetic** - Buildings have usually been intended to look well, in addition to being soundly constructed and fit for their purpose, and many were erected with serious artistic intent. Others may exhibit more informal qualities of richness, maturity, or picturesqueness.

10) **Environmental Significance and Sense of Belonging** - In a world of increasingly ubiquitous new buildings, where a redeveloped town center looks very much like another, historic buildings by their layout, form and materials can often give an important sense of place and identity that would otherwise be lacking.

11) **Landmarks** - Often, historic areas are punctuated with landmark buildings, such as churches, temples, mosques or town halls that provide focal or reference points in the local built landscape. They also function as a major social hub in a city, town or village.

12) **Human scale** - The local environment is the immediate setting for the lives of people who reside or work there and often historic areas have a human scale that may not be found in areas that have been comprehensively redeveloped around modern means
of locomotion such as motorised transport or according to the notions of modern town planners and property developers.

13) Townscape - Historic areas, built with local materials display mature townscape qualities that have evolved over a long period and which are not always easy to achieve in the comprehensive redevelopment of today.

What is a Ancient Monument? - According to Section 2(a) of The Ancient Monument and Archaeological Sites and Remains Act, 1958, the meaning of expression “ancient monument” includes any structure, erection or monument, or any tumulus or place of interment, or any cave, rock-sculpture, inscription or monolith, which is of historical, archaeological or artistic interest and which has been in existence for not less than one hundred years. Furthermore, it includes

i) The remains of an ancient monument,

ii) The site of an ancient monument,

iii) Such portion of land adjoining the site of an ancient monument as may be required for fencing or covering in or otherwise preserving such monument, and

iv) The means of access to, and convenient inspection of, and ancient monument.

This concept of heritage or legacy, which we have acquired, comprises of the monuments, location, people and their cultural aspect within its growing ambit. From grand national monuments to humble buildings that form the fabric of Indian settlements, the cultural property of the country constitute a priceless resource for local, national and international communities alike. The architectural and artistic legacies bear witness to the complex history of innovation and cross-cultural exchange that dates back to the earliest period of human civilisation, and continue to shape local identities to this day. These sites and artefacts are the touchstone of our collective cultural memory, and the foundation upon which communities can build their future.

3. Heritage Conservation and Urban Design

Cultural endowments such as traditional architecture, unique streetscapes, and historic sites are increasingly recognised as important economic resources in both developed and developing countries. Cities are often an important focal point for development based on these resources because they provide concentrations of heritage assets, infrastructure services, private sector activity and human resources. Improving the conservation and management of urban heritage is not only important for preserving its historic significance, but also for its potential to increase income-earning opportunities, city livability, and competitiveness.

Urban areas house most of the man made structures created over centuries. While some have turned to dust with the ravages of time, many heritage structures survive and are worthy of protection intelligent conservation and preservation. In most growing cities, heritage structures, both built and natural are under serious threat. Building activity, construction of roads and flyovers, pressures for increasing infrastructure and general apathy towards our heritage has led to neglect, damage and destruction of many structures possessing architectural, historical, social and artistic qualities.
Historic cities, buildings and sites are central to creating and reflecting national and individual identities, constituting a physical continuity with the past. Furthermore, it is increasingly recognised that issues of cultural identity are of profound social significance in a rapidly changing world. Culture is intrinsic to development, making economic and social gains sustainable. Considerations of conservation in development should thus be seen not only in the light of preserving the built and natural environment, but also the fundamental elements of the social environment equally.

The earliest known efforts to preserve architectural objects in the modern world of cultural value date from the 15th and 16th centuries, when some of the Catholic Popes in Europe exerted their influence and financial power to protect Roman ruins. It was not until the 18th century however that more organised forms of architectural protection occurred in Europe. Only the 20th century saw a more widespread and systematic protection of the built patrimony worldwide.

Although each generation has an obligation to preserve and transmit the cultural and historic legacy it has inherited, it is not uncommon to witness the destruction of historical or cultural amenities. Cities around the world are facing a similar dilemma: how to develop without destroying the architectural and urban legacy? Many cities have paid a high price for modernisation and development in the name of progress. Escalating land prices and speculation in historic centers make land too dear for low-rise structures leading to irreversible heritage losses.

Heritage based urban development is a young field of research and practice. The conventional approaches to conservation have in the recent past been the subject of discussion and research at various forums. On the other hand, Indian urban planning methods developed in the 1960s, do not give due consideration to the rich urban heritage of India. The National Urban Renewal Mission (JNNURM), a programme to implement decentralisation and support urban development, has recently acknowledged the importance of urban heritage. It is now, as a first effort, requesting the cities to integrate heritage studies and planning in the City Development Plan. Another step to protect urban heritage has been taken by the Ministry of Culture and Ministry of Urban Development in the joint development of Model Byelaws for the protection of heritage buildings and heritage areas.

**Box 2: Conventional Approaches to Conservation of Heritage Buildings**

Built and natural environments are ultimately and collectively tangible records of history and as “heritage” belong to time. Conservation, in its broadest sense, is concerned with the assessment of these environments in order to make it relevant for the present and ensure its survival in the future. At present, different legislative bodies are involved in promoting the conservation of the built and natural environments with minimal consideration of the interconnections between the two areas of conservation. A critical discussion regarding confluence of built and natural heritage in promoting the notion of “cultural landscape” is essential to further and more comprehensively develop the field of conservation.

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1 See Box 2
Cultural landscapes can encompass vast and diverse areas, which are usually administered by different territorial and specialised authorities (e.g. the Ministries of Culture, Housing, Urban Planning, Tourism, Environment, Agriculture, Water Resources etc.). Therefore, the different national and local authorities responsible for zoning, infrastructure development, environmental and architectural conservation must establish effective co-ordination and define appropriate management tools to authentically preserve features of cultural landscapes. Integrity of the relationship between natural and built (cultural) environments is essential for sustainable conservation, making it a shared responsibility.

In recent decades, most practitioners and professional networks of conventional approaches to heritage conservation have limited their foci to only one or two of the following scales:

- interior building and building;
- building and site;
- site and neighbourhood;
- landscape and metropolitan region

The “conventional” or “traditional” approaches to conservation focus on the sectoral and regional concepts of realisation. However, the dynamic and new approaches focus on a process- and actor-oriented, interdisciplinary approach, in which subsequently and step-wise first the key drivers of urban change, second the major problem of urban social coherence and third the question of how to activate and strengthen urban civil society should be addressed.

Today, with increasingly complex and daunting environmental change, more holistic approaches to responding to conservation needs require thinking and operating at these four scales or more. Several disciplines must take part in giving a new lease of life to historic buildings and sites. Archaeologists excavate layers of history to piece together and reconstruct the social and cultural life of a past civilisation.

Architects investigate the relevance of these artifacts to the diverse stakeholders in the present and develop a comprehensive conservation plan. Conservationists document, interpret and pursue a course of action to preserve, restore, or conserve the physical aspects of significant monuments. Curators ensure the appropriate restoration and public display of artworks associated with these monuments. Conservation of cultural heritage thus pursued can promote sustainable survival of the built and natural environments.

For the architectural community to engage meaningfully in heritage conservation, responsibilities and opportunities revolving around this activity needs to be recalled, analysed, and articulated. To address such issues, architectural practitioners, educators, and researchers and their counterparts in the environmental design fields must be engage together in a holistic restoration and study of heritage notion, design realm, conservation context, and education and information.
In the context of increasing globalisation, worldwide processes of urbanisation are of growing importance for research, teaching and capacity enhancement, particularly in regard to development policy and economic cooperation. While international development cooperation until today has focused and still focuses mainly on rural developments, the necessity for closer examination of the challenges and problems of urban and peri-urban regions is becoming more and more apparent. Cities offer substantial socio-economic potential for sustainable development, but are also places with considerable ecological and socio-economic challenges and subject to increasing socio-economic vulnerability as well as socio-spatial and institutional fragmentation, segregation and disparities. The close proximity of a great variety of local lifeworlds and lifestyles in urban areas as well as different ethnic and social groups, may disintegrate and destabilise urban societies.

**Conservation vs Development** - A conflict between the preservation of the character of existing historic towns and “change” has formed the central argument for conservation. More recently, heritage has superseded conservation, where marketing of heritage as a product according to the demands of the consumer, mainly tourists, has resulted in the commercialisation of heritage over conservation values. Today, the symbiosis of both tourism and heritage places has become a major objective in the management and planning of historic areas.

There exist various arguments pertaining to the current conflicts among the ideas of conservation, heritage, and tourism and argues for a sustainable approach to the management and planning of heritage places based on a community and culture-led agenda.

Some basic arguments for pro-conservation are as follows:

1) Tourism  
2) Livelihood  
3) Preservation of Traditional Wisdom and Cultural Knowledge

Despite the various pros of conserving our heritage, there is no dearth of arguments that are against heritage conservation either. These obstacles in the path to conservation of built heritage are as follows:

1) Pressure to direct funds for infrastructure development  
2) Lack of time or compassion for conservation efforts  
3) Lack of skill/expertise and dearth of professionals in the area  
4) Public apathy

Upon the analysis of the actual state of conservational efforts as well as all the administrative aspects of heritage conservation, especially in India, we can historical landscapes were threatened by a number of factors, including poverty and economic growth. Misinformed public policies and market forces were culprits as well.

All said and done, there are a some Grey Areas of conservation that affect the efforts. However, with proper channelising, the such areas could be manipulated to gain high and desired conservational effects. One such area is the ‘Private ownership of some heritage buildings/properties’, either fully or partially (e.g., many buildings have been now converted to heritage hotels).
Although they will vary in age and style from country to country, all countries possess buildings which are regarded as being integral parts of their heritage, worthy of protection and conservation. However, their continued existence cannot be taken for granted - many of them are in private ownership and they are constantly under threat from demolition by neglect to demolition to make way for new development. It is, however, generally thought to be a ‘good thing’ to try to devise some means by which heritage buildings can be conserved. A prime means by which this is done is through funding measures from government - offering some form of financial support or concession to the owners of these buildings.

These mechanisms for the conservation of the architectural heritage can be regarded as being either direct or indirect tools of government action. A direct incentive, such as grant aid, involves a government body directly transferring money to private owners to finance (or part finance) a conservation activity. An indirect incentive, such as a tax incentive, does not involve a direct transfer of money and no state expenditure is recorded.

4. International Framework

For examining the international framework for heritage buildings protection, it is important to analyse the conventions and agreements that are relevant to the protection and conservation of art and cultural heritage and to which India is a signatory. Attention must be invited to Article 253 of the Constitution of India, which enables Parliament to legislate for the implementation of any treaty agreement or convention with any other country or countries, or any decision, made at any international conference, association or other body. Any such legislation can be enacted even if the subject matter of the legislation is an item in the State List of the Constitution of India. The Environment (Protection) Act, 1986 was enacted by Parliament to implement the decision (declaration) made at the Conference on the Human Environment convened by the United Nations at Stockholm in 1972.

With respect to the international efforts to conservation, UNESCO has played an active role focusing international attention on the stewardship and preservation of monuments and cultural property. This is now a rapidly evolving area of international law. The major international treaties include the 1954 Hague Convention for the Protection of Cultural Property in the Event of Armed Conflict, the 1970 UNESCO Convention on prohibiting the trade in illicitly-obtained cultural property, and the 1995 Unidroit Convention on the repatriation of Cultural objects.

However, the question remains as whether these laws, regulations, rules and international treaties to conserve the monuments are dead-letter law. Is the Government or the international community putting their best efforts into the enforcement of laws already enacted? But before that, are these laws and statutes, comprehensive enough to provide adequate conservation of monuments? These are the main questions that require to be addressed on an urgent basis.

UNESCO, the United Nations Education, Science and Culture Organisation, adopted in 1972 the World Heritage Convention in order to protect unique natural or cultural monuments and sites worldwide today, the World Heritage List comprises of 936 properties forming part of the cultural and natural heritage which the World Heritage Committee considers as having outstanding universal value. These include 725 cultural, 183 natural and 28
mixed properties in 153 States Parties. As of November 2011, 188 States Parties have ratified the World Heritage Convention\(^2\).

UNESCO has a unique responsibility as the sole United Nations agency with the mandate for promoting the stewardship of the world’s cultural resources at all levels. The responsibility for safeguarding the world’s cultural properties begins at the highest legal and international governmental levels and descends through practical and technical levels down to grass-roots advocacy and hands-on fieldwork. UNESCO’s activities in the safeguarding of cultural properties revolve around three axes: Prevention, Management and Intervention. UNESCO oversees a number of international conventions and treaties that assist countries in safeguarding their cultural heritage. Three key conventions have been formulated and adopted in this field:

- **The Hague Convention:** The 1954 Convention for the Protection of Cultural Property in the Event of Armed Conflict is known as the Hague Convention. This convention came out of the experience of two World Wars. It has been adopted together with its Protocol concerning the return of cultural property illegally exported during an armed conflict. It recognises the principle that the cultural heritage of any people is the cultural heritage of all. It declares that the deliberate targeting and destruction of non-military cultural heritage is a war crime. It laid the foundations for UNESCO’s efforts to preserve and protect threatened sites in war zones.\(^3\)

- **The 1970 Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property:** This was the first UNESCO convention to deal with the problem of illegal export of cultural property and its return to source states. It alerts all states to the importance of their own cultural heritage and its protection from neglect, war, or threats from development. It also obligates signatories to take appropriate steps to return objects that could be shown by inventories to have come illegally from another state’s museums or other institutions. The 1970 convention, though weak and only sporadically invoked, has provided the foundation for all subsequent activity in the field of cultural property law and the ethics of collecting.

- **The World Heritage Convention:** The 1972 Convention Concerning the Protection of the World Cultural and Natural Heritage, is known as the World Heritage Convention. This Convention set up the UNESCO’s World Heritage List. Individual states nominate sites of worldwide cultural significance in their own territories to be added to the List for consideration by the Committee at annual meetings. Sites protected tend to be famous monuments, archaeological sites of disappeared indigenous populations, and unique natural preserves or habitats. The Committee tries to publicise the sites, watch them carefully, and alert the world to any that may be threatened by war, neglect, or development.\(^4\) The 1972 treaty has initiated the process of recognising world heritage sites, categorised either as a cultural item (man made), or as a natural item (created by nature).

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\(^2\) [http://www.unesco.org](http://www.unesco.org) as visited on 22-01-2012.


UNIDROIT Convention on Stolen or Illegally Exported Cultural Objects (1995): UNESCO commissioned the International Commission Institute for the Unification of Private Law (UNIDROIT) to help prepare stronger rules and means than were envisioned in the 1970 Convention. It covers cases of theft, dispossession, ownership and repatriation across national borders involving private citizens in an attempt to get to the heart of the smuggling problem. It requires the return of cultural property to the Source State.5

The Hague Convention and the 1970 Convention address the growing illicit trade in cultural artefacts. These conventions says that:

a) Natural and the cultural heritage are being increasingly threatened by traditional causes of decay as well as by the changing social conditions that have aggravated the problem.

b) The states must assist each other in the task of conservation and preservation as well, but with the permission of the state so concerned.

c) The heritage sites are of boundless interest and knowledge and all the efforts must go into the protection of such an irreplaceable property.

d) Destruction of heritage is nothing but leading towards impoverishment, a condition that effects all the nations, and

e) UNESCO can assist the states in conserving the monuments and heritage sites, if the states think that there is some kind of limitation pertaining to that matter.

In course of drafting the 1954 Hague Convention and the 1970 convention it was observed that the international community was increasingly acknowledging the practice of removing objects of significant importance to a culture’s history and identity from their place of origin as unethical. Moreover, in 1978, the UNESCO Intergovernmental Committee for Promoting the Return of Cultural Property to its Countries of Origin or its Restitution in case of Illicit Appropriation was set up. Its role is to act as an international forum for negotiation, discussion and awareness raising in cases where the legal framework, provided by the 1970 Convention, does not apply.

The UNESCO also assists national authorities in developing multidisciplinary plans of action, and implementing projects through the following measures6:

- Identification, inventory, documentation, technical analysis and conservation.
- Site management, protection from trauma: both natural and man-made
- Risk preparedness and Rehabilitation.

UNESCO seeks to encourage the identification, protection and preservation of cultural and natural heritage around the world considered to be of outstanding value to humanity. This is embodied in an international treaty called the Convention concerning the Protection of the World Cultural and Natural Heritage, adopted by UNESCO in 1972.

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6 http://www.molton.com/cultprop
UNESCO’s World Heritage mission is to:

♣ encourage countries to sign the World Heritage Convention and to ensure the protection of their natural and cultural heritage;

♣ encourage States Parties to the Convention to nominate sites within their national territory for inclusion on the World Heritage List;

♣ encourage States Parties to establish management plans and set up reporting systems on the state of conservation of their World Heritage sites;

♣ help States Parties safeguard World Heritage properties by providing technical assistance and professional training;

♣ provide emergency assistance for World Heritage sites in immediate danger;

♣ support States Parties’ public awareness-building activities for World Heritage conservation;

♣ encourage participation of the local population in the preservation of their cultural and natural heritage;

♣ encourage international cooperation in the conservation of our world’s cultural and natural heritage.

It can be said, therefore, that what the UNESCO seeks is to change the attitudes of national and international communities towards the cultural heritage issue, making it a matter of concern to the general public, to strengthen national legislation and institutional capacity, to promote the involvement of all stakeholders, particularly local communities who can bring traditional knowledge to bear on the problems at hand.

Box 3: Criteria of selection of sites for World Heritage Sites List

Criteria for selection - To be included on the World Heritage List, sites must be of outstanding universal value and meet at least one out of ten selection criteria. These criteria are explained in the Operational Guidelines for the Implementation of the World Heritage Convention which, besides the text of the Convention, is the main working tool on World Heritage. The criteria are regularly revised by the Committee to reflect the evolution of the World Heritage concept itself.

Until the end of 2004, World Heritage sites were selected on the basis of six cultural and four natural criteria. With the adoption of the revised Operational Guidelines for the Implementation of the World Heritage Convention, only one set of ten criteria exists.

The criteria are:

♣ to represent a masterpiece of human creative genius;

♣ to exhibit an important interchange of human values, over a span of time or within a cultural area of the world, on developments in architecture or technology, monumental arts, town-planning or landscape design;

♣ to bear a unique or at least exceptional testimony to a cultural tradition or to a civilisation which is living or which has disappeared;

♣ to be an outstanding example of a type of building, architectural or technological ensemble or landscape which illustrates significant stage(s) in human history;
to be an outstanding example of a traditional human settlement, land-use, or sea-use which is representative of a culture (or cultures), or human interaction with the environment especially when it has become vulnerable under the impact of irreversible change;

to be directly or tangibly associated with events or living traditions, with ideas, or with beliefs, with artistic and literary works of outstanding universal significance. (The Committee considers that this criterion should preferably be used in conjunction with other criteria);

to contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance;

to be outstanding examples representing major stages of earth’s history, including the record of life, significant on-going geological processes in the development of landforms, or significant geomorphic or physiographic features;

to be outstanding examples representing significant on-going ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals;

to contain the most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation.

The first six points are criteria for selection for cultural sites. The other four are criteria for natural sites.

There are application forms that must be filled correctly and thoroughly and then there are operational guidelines for the implementation of the World Heritage Convension. These documents are usually very lengthy and detailed. The latest version of the operational guideline is 173 pages long.

Likewise, there is a strict format that must be used for filling any application for additional sites to be listed by UNESCO. This format is also over 60 pages long, and would be serious and professional effort, to fill out and provide details enough to pass the review process of UNESCO. For example, even the geographic location of the site needs to be declared with very detailed boundary maps supported by accurate latitude and longitude markings giving degree minute and seconds for each of the corners as well as the calculated area in hectares etc. It must also provide documentation describing which state party is in control of the land on which the site exists etc. The details of just this part would take up more than two pages.

The description of the property can take up several pages, keeping in mind which of the ten selection criteria is to be fulfilled.

Then the state parties have to undertake the responsibility of things such as:

● ensure the identification, nomination, protection, conservation, presentation and transmission to future generations of the cultural and natural heritage found within their territory, and give help in these tasks to other States Parties that request it;
Conservation of Heritage Buildings

- adopt general policies to give the heritage a function in the life of the community;
- integrate heritage protection into comprehensive planning programmes;
- establish services for the protection, conservation and presentation of the heritage;
- develop scientific and technical studies to identify actions that would counteract the dangers that threaten the heritage;
- take appropriate legal, scientific, technical, administrative and financial measures to protect the heritage;
- foster the establishment or development of national or regional centers for training in the protection, conservation and presentation of the heritage and encourage scientific research in these fields, etc.

The application must describe the present state of conservation, factors that affect the site, details of development and urbanisation pressures such as encroachment, adaptation, industrialisation, mining activity, agriculture etc., along with environmental issues such as deforestation or climate change, visitor/tourism pressures, number of inhabitants within the site and around the buffer zone.

With regard to the protection of the property, the applicant must provide a clear picture of the legislative, regulatory, contractual, planning, institutional and/or traditional measures and the management plan or other management system that is in place to protect and manage the property.

The applicant must clearly define the ownership of the land - the major categories of land ownership (including State, private, treaty, trustee, other ownership, etc.). The applicant must list the relevant legal, regulatory, contractual, planning, institutional and/or traditional status of the property: For example, national or provincial law or custom; or other designation, as well as describe how these authorities are now providing protection of the land. There also needs to be a description of protective plans so far adopted from the municipal level onwards.

The application needs to have attachments, or annexes, giving detailed plans for the property, as well as declare the source from where the required funding must come, for the implementation of these plans. The application must also provide documented evidence of its sources of expertise in handling this project.

A recognised world heritage site is expected to generated additional tourism and visitors. There needs to be a plan for handling this additional visiting crowd - with interpretation (for foreign language speakers), explanations, demarcated walking trails for them to see the site etc.

It should however be noted that there have been items that a satisfied the criteria, and later failed to live up to it, and have been de-listed.

The UNESCO’s World Heritage Sites List already includes a number of sites from India. Cultural Sites from India already listed are as follows:

7 All images from ASI and UNESCO websites.
1) Agra Fort

2) Ajanta Caves

3) Ellora Caves
4) Taj Mahal

5) Group of Monuments at Mahabalipuram

6) Sun Temple, Konârak
7) Manas Wildlife Sanctuary

8) Kaziranga National Park

9) Keoladeo National Park
10) Churches and Convents of Goa

11) Fatehpur Sikri

12) Group of Monuments at Hampi
13) Khajuraho Group of Monuments

14) Elephanta Caves

15) Great Living Chola Temples
16) Group of Monuments at Pattadakal

17) Sundarbans National Park

18) Nanda Devi and Valley of Flowers National Parks
19) Buddhist Monuments at Sanchi

20) Humayun’s Tomb, Delhi

21) Qutub Minar and its Monuments, Delhi
22) Mountain Railways of India

23) Mahabodhi Temple Complex at Bodh Gaya

24) Rock Shelters of Bhimbetka
25) Champaner-Pavagadh Archaeological Park

26) Chhatrapati Shivaji Terminus (formerly Victoria Terminus)

27) Red Fort Complex
Apart from the 28 sites inscribed on the World Heritage list, India has also maintained a list of tentative sites for recognition which has been submitted to UNESCO Committee for evaluation and acceptance. This procedure of prelisting is a prerequisite for the nominations for the World Heritage list to be accepted.

1) Temples at Bishnupur, West Bengal is famous for its terracotta temples and the balucheri sarees.(1998)

2) Buddhist Monastery Complex, Alchi, Leh, is also known as “Alchi Chos-kor”. (1998)


4) Dholavira: a Harappan City in Gujarat, Kachchh district, is one of the largest and most prominent archaeological sites in India, belonging to the Indus Valley Civilisation. (1998)

5) Rani ki vav (The Queen’s Stepwell) at Patan, Gujarat, is a famous stepwell. (1998)

6) Mattancherry Palace, also known as the Dutch Palace, in Mattancherry, Kochi, Kerala features Kerala murals depicting Hindu temple art, portraits and exhibits of the Rajas of Kochi. (1998)

7) Tomb of Sher Shah Suri, Sasaram, Bihar, was built in memory of Afghan Emperor Sher Shah Suri who ruled Delhi in Northern India for five years, after defeating Humayun, the 2nd Mughal Emperor. (1998)

8) Mandu, Madhya Pradesh Group of Monuments are in the fortress town on a rocky outcrop about 100 km (62 mi) from Indore, and are celebrated for their fine architecture.(1998)

9) Ancient Buddhist Site in Sarnath, Varanasi, Uttar Pradesh where Gautama Buddha first taught the Dharma, and where the Buddhist Sangha came into existence through the enlightenment of Kondanna. (1998)
10) Hemis Gompa, a Tibetan Buddhist monastery of the Drukpa Lineage, is located in Hemis, Ladakh, 45 km from Leh. (1998)


13) The Matheran Light Railway, is an extension to the Mountain Railways of India. (2005)

14) Western Ghats, also known as the Sahyadri Mountains, a mountain range along the western side of India and one of the world’s ten “Hottest biodiversity hotspots” (sub cluster nomination). (2006)

15) Namdapha National Park, the largest protected area in the Eastern Himalaya biodiversity hotspot is located in Arunachal Pradesh in Northeast India. (2006)

16) Wild Ass Sanctuary, largest wildlife sanctuary in India is known for the endangered wild ass sub-species of Indian Wild Ass in Little Rann of Kutch. (2006)

17) Kangchendzonga National Park, a national park and a Biosphere reserve is located in North Sikkim district. (2006)


19) The Kangra Valley Railway - Extension to the Mountain Railways of India. (2009)

20) Churchgate, a Churchgate station, is a terminus of Western Railway line of Mumbai suburban railway. Extension to Mumbai CST. (2009)

21) The Maharaja Railways of India comprises several railway lines that were maintained in the past by the erstwhile Maharajas of India during the British rule. (2009)

22) Oak Grove School, the school was started by the British East India Company on June 1, 1888, predominantly caters to the children of Indian Railways employees. (2009)

23) Excavated Remains at Nalanda, an ancient center of higher learning, is one of the world’s first residential universities with a number of ruined structures in Bihar. (2009)

24) Great Himalayan National Park is the latest addition to India’s national parks, located in Kullu region in the state of Himachal Pradesh. (2009)


26) Neora Valley National Park one of the richest biological zones in the entire Northeast situated in the Kalimpong subdivision under Darjeeling District in West Bengal. (2009)

27) Desert National Park, an example of the ecosystem of the Thar Desert. (2009)

28) Silk Road Sites in India, is part of the extensive interconnected network of trade routes across the Asian continent connecting East, South, and Western Asia with the Mediterranean world, as well as North and Northeast Africa and Europe. (2010)

29) Santiniketan made famous by Nobel Laureate Rabindranath Tagore, whose vision became the present university town Visva-Bharati University. (2010)
30) Delhi, India’s historic national Capital- nominated for World Heritage City status. (2011)

31) Ahmedabad, the historic and most important city of the state of Gujarat in India- nominated for World Heritage City status. (2011)

5. Conservation of Heritage Buildings in India

The need to preserve Greek ruins as a cultural necessity was recognised by the early Romans, and rules for conservation were established as early as the eighth century AD. However, the practice was not effectively institutionalised by law in European countries until the middle of the nineteenth century, and it is only very recently that the issue has become one of truly international concern. In India, even though we have a very old, and remarkably continuous civilisation, the practice of conservation was introduced by Lord Curzon in 1902 with the consolidation of the Archaeological Survey of India (ASI). As an issue of wider public and professional concern, however, it is still nascent.

In India, introduction of ASI in 1902 paved way for bringing their conservation through legislation. The Constitution of India under fundamental duties mandates the citizens to value and preserve the rich heritage of our composite culture. Since inception, the Archaeological Survey of India has identified around 7000 monuments as protected in this vast country, which is proud of its rich heritage.

In India, master plans, urban development schemes, urban renewal schemes, etc; have been prepared under urban, regional, town planning acts, development authority acts and municipal acts. Most of these statutes recognise ‘conservation of heritage’ as part of such schemes.

Of late, more emphasis is being placed on this sector in physical planning and the role of urban conservationists is getting widely recognised. Conservation of Heritage was a major concept underlying the Perspective Plan for Delhi 2001. The survey conducted by ASI identified 1,321 monuments, sites and buildings of historic value in Delhi, out of which 411 were within the walled city of Shajahanabad alone. One among the eight major concepts of the Master Plan for Delhi, 2001 was to ‘Conserve the Urban Heritage of Delhi’ by designating historic areas as ‘Controlled Conservation Areas’ for which special plans for conservation and improvement has to be formulated. This concept also emphasized on the importance of ‘modernisation with conservation’.

The Master Plan for Delhi, 2021 too emphasizes the need for conservation of heritage and identifies heritage zones for detailed plan formulation. The UDPFI Guidelines prepared by the Institute of Town Planners, India in 1996 also suggested that Heritage and Conservation Areas including old built up and scenic value areas should be treated as ‘Special Areas’ while formulating proposals.

In Maharashtra, a Heritage Committee was constituted under the Urban and Regional Planning legislation in order to conserve the heritage buildings and precincts in Mumbai. This was followed up by a few other cities in India too. For example, Hyderabad Master Plan lays down procedures for listing and grading of heritage and general regulations for the listed heritage buildings and precincts, which closely resembles with the model heritage regulations advocated by the union government.

8 Article 51 A.
Criteria for Listing Built Heritage

In selecting a building, particular attention should be paid to the following:

♣ Association with events, activities or patterns
♣ Association with important persons
♣ Distinctive physical characteristics of design, construction or form, representing work of a master
♣ Potential to yield important information such as illustrating social, economic history, such as railway stations, town halls, clubs, markets, water works, etc.
♣ Technological innovations such as dams, bridges, etc.
♣ Distinct town planning features like squares, streets, avenues, e.g. Rajpath in Lutyen’s New Delhi

One or more of these concepts need to be applicable to a building to make it worthy of listing. Apart from these general concepts three key concepts need to be understood to determine whether a property is worthy of listing or not.

1) Historic significance - Historic significance is the importance of a property to the history, architecture, archaeology, engineering or culture of a community, region or nation.

2) Historic integrity - Historic integrity is the authenticity of a property’s historic identity, evidenced by the survival of physical characteristics that existed during the property’s historic period.

Historic integrity enables a property to illustrate significant aspects of its past. Not only must a property resemble the historic appearance but it must also retain physical materials, design features and aspects of construction dating from the period when it attained significance.

3) Historic context - Historic context is information about historic trends and properties grouped by an important theme in the history of a community, region or nation during a particular period of time. A knowledge of historic context enables listers to understand a historic property as a product of its time.

A historic building complex may comprise of numerous ancillary structures besides the main structure within the same precinct giving the complex its identity. Each such structure contributing to the complex needs to be documented on individual proformas but in a sequence at one place.

Mere listing is of limited use unless it serves the cause of preservation and conservation of the heritage of the area. Publication of the Listing of the area does help in raising the level of awareness and public consciousness about what constitutes their heritage. However, the cause of preservation and conservation of heritage can be served only by providing statutory backing to the listing. Only the statutory backing makes it an effective tool for conservation.

Listing of the built heritage and giving it a statutory back-up has to be in accordance with rules/regulations/byelaws framed under the relevant state Acts that govern the development
and use of land. In most states this activity is controlled and regulated under the state’s town and country planning legislation. Heritage Regulations can be and should be suggested and formulated under such relevant legislation. Such Heritage Regulations have been adopted in some states (Maharashtra, Andhra Pradesh, West Bengal, etc).

It should, however, be noted that the responsibility to enforce the Heritage Regulations is of the municipal authority in the urban areas (Municipal Corporation, Municipal Council or the Municipal Panchayat or the Cantonment Board) and of the Panchayati Raj Institutions in the rural areas (Zilla Panchayat Parishad, Janpad Panchayat and the Gram Panchayat/ Gram Sabha). In some cases the municipal authority concerned (such as the Municipal Corporation of Delhi and the New Delhi Municipal Committee in Delhi and the Calcutta Municipal Corporation in Calcutta) has notified the list of heritage buildings and precincts under the relevant municipal byelaws. Chapters should similarly familiarise themselves with the provisions of these regulations and ensure their implementation accordingly in their areas.

Conservation of heritage buildings may involve a process where monuments are frozen or mummified; at times, later additions are removed and the structure is restored to its original/authentic state of existence. This may be necessary in certain cases but it is not comprehensive enough to cover a wide range of built heritage that is present especially in our country. For example, age alone cannot be a criterion for valuing a building. A building may not be hundred years old, but can still be considered important for its commemorative importance or its architectural merit. Second, we cannot declare all heritage buildings as monuments and afford to freeze it either. There are a host of structures whose survival or sustenance will be meaningful and possible only through their rouse. Hence, there is a need to have a different approach and attitude to find a place for a host of other “living” buildings i.e., buildings that are still being inhabited. Conservation of many buildings may involve repair, addition and reconstruction without damaging the value of the fabric. However, much of this reconstruction could be authentic. That is, with the traditional crafts and craftsmen still existing, many of these structures or portions of them can be built as before. This traditional skill too has to be recognised as part of the heritage and linked with conservation efforts. Ignoring this and misconceiving heritage as something genuine and frozen can cause irreparable damage.

Constitutional Provisions

All the laws, be they Central or State, draw attainability and validity from the Constitution of India. Some of the provisions that are significant to us in our current context are as follows:

1) Article 49 - Article 49 of the Constitution states that “it shall be the obligation of the State to protect every monument or place or object of artistic or historical interest, declared by or under law made by Parliament to be of national importance, from spoliation, disfigurement, destruction, removal, disposal or export, as the case may be”.

2) Article 51A(F)9 - Article 51(A) of the Constitution of India describes that it as a fundamental duty of every citizen to value and preserve the rich heritage of our composite culture.

9 “It shall be the duty of every citizen of India to value and preserve the rich heritage of our composite culture” - Article 51 A (F) of the Constitution of India.
The role of citizens in mobilising the heritage preservation drive is very significant. For tapping this potential of an organised citizen movement, it is suggested that the civil societies must also identifying knowledgeable and committed resource groups that can help in the identifying, listing and documenting of buildings and precincts that qualify for listing. Civil societies can benefit immensely by involving such persons in drawing up advocacy plans to create awareness about the need to protect and conserve the listed built heritage. For instance, using the expertise of such persons to draw up heritage trails and walks in some important heritage areas and motivating them to volunteer their services for such activities. School teachers could be trained to enrich class room teaching by taking their students for such outdoor activities.

2) **73rd and the 74th Amendments to the Constitution** - The 73rd and 74th Amendments to the Indian Constitution brought in a Local Government system as the third tier of governance with focus on economic development and social justice.

Local communities or individuals must be entrusted with responsibilities to conserve their own heritage. Where outside expertise is necessary, local stakeholders must be made active participants at all stages of the conservation process. All decisions regarding the conservation and management of heritage must be taken in consultation with local communities in consonance with the 73rd and 74th Amendments to the Constitution of India.

3) **Article 243-G and Article 243-N** - The Articles deal with decentralisation of powers to the Panchayati Raj Institutions (PRIs) in respect of the rural areas and the urban local bodies in respect of the urban areas. Most States have either enacted fresh legislation to give effect to these constitutional requirements or suitably amended the existing laws to achieve the purpose. **Entry No. 21** of the Eleventh Schedule of the Constitution applicable to PRJs states “cultural activities”, and **Entry No. 29** of the same to “maintenance of community assets”. Similarly **Entry No. 13** of the Twelfth Schedule of the Constitution applicable to urban local bodies refers to “promotion of cultural, educational and aesthetic aspects”. **Entry No. 1** of the same schedule refers to “urban planning, including town planning” and **Entry No. 2** to “regulation of land use and construction of buildings”, and **Entry No. 3** to “Planning for economic and social development”. All these provisions could be used for advocacy and for persuading the PRIs and Urban Local Bodies to be pro-active for the protection and conservation of their built heritage.

4) **Seventh Schedule** - **Entry No. 67** of 7th schedule pertaining to the List I (Union List) states ‘Ancient and historical monuments and records, and archaeological sites and remains, declared by Parliament by law to be of national importance”. **Entry No. 40** of List III (Concurrent List) of the Seventh Schedule refers to “Archaeological sites and remains other than those declared by Parliament by law to be of national importance”.

**Entry No. 40** of the Concurrent List of the Seventh Schedule of the Constitution empowers both the Parliament and the State Legislatures to enact laws in respect of “Archaeological sites and remains other than those declared by Parliament by law to be of national importance”.

**Entry No. 12** of the Seventh Schedule pertaining to List II-State List states “Libraries,, museums, and other similar institutions controlled or financed by the State, ancient and
historical monuments and records other than those declared by Parliament by law to be of national importance”. Most States have, accordingly, enacted laws for the protection and conservation of their cultural assets. The particular laws that are most important for the conservation of the art and cultural heritage are the ‘laws for protection and conservation of monuments, archaeological sites and remains’, ‘town and country planning laws’, the laws regulating ‘land use’ and the laws prescribing the ‘duties and responsibilities of the State agencies, particularly the Panchayati Raj Institutions (PRIs) in the rural areas and the Urban Local Bodies in the urban areas’.

Accordingly, we have the following laws at the Central level:

- The Indian Treasure Trove Act, 1878.
- The Ancient Monuments Preservation Act, 1904.
- The Antiquities (Export Control) Act, 1947.
- The Water and Air Acts.

Yet, here once could say that what is emerging in the process is, on the one hand, a clearer definition of the concepts of conservation planning and management, and on the other, an option to reassess our development ideology and model itself. Particularly in India, it is becoming clearer that conservation instead of being a marginal technical activity at odds with the real world as in the West, could, in fact, be central to the definition of our identity.

Over five hundred centrally-protected monuments for structural conservation, chemical preservation and development have been identified by ASI under the tenth five-year Plan. The primary interest of this institution was antiquity and authenticity. Even after independence, this colonial legacy continues. As a result, about 5000 monuments alone have been declared as heritage sites. Another equal number of monuments has been identified by various other state departments of archaeology. The Ancient Monuments and Archaeological Sites and Remains Act of 1958, declares buildings that are 100 years old and above as monuments and provides for their protection. Monuments are frozen or mummified; at times, later additions are removed and the structure is restored to its original/authentic state of existence.

6. Conclusion

While modernisation is current demand, traditional culture that bases its entity on the past is not dead and gone. It is still practiced and living, it is a continuous process, open to adjustment. Thus if development is to be achieved it should be the development based on the conservation model.

In India the legal scenario, which is being witnessed by us, is a scenario resulting from the budgetary constraints of the central government and its agency that protects and maintains historic structures. This however excludes hundreds of thousands of other
architectural sites and monuments from government protection, leaving them acutely vulnerable and unprotected, and it is clear that the legislations in this regard are inadequate or improperly framed. At the same time the cities in our country grapple with issues of an exploding urban population, limited infrastructural and budgetary resources and increasing inner city decay. This results in a greater vulnerability of its architectural and cultural heritage which is gradually becoming prey to malices like successive encroachments and bad, irregular and unplanned town planning policies.

In this given scenario economic incentives and tax credits especially pertaining to guidance and facilitation of conservation, along with the phenomenon of public-private partnerships, could perhaps be adopted. The broad partnership between public and private entities, professionals and local community craftspeople has proven to be a critical element in ensuring the long-term success and viability of preserving cultural properties.

Coordination and cooperation among the government agencies and private sectors engaged in cultural activities, especially the Non Governmental Agencies like Indian National Trust for Art and Cultural Heritage (INTACH) and the International Council on Monuments and Sites (ICOMOS) must be promoted.

In India, there is an opportunity, indeed a necessity, for making planning conservation oriented. The existing town and country planning acts do have provisions for conferring special status to buildings and heritage areas. However, for many reasons (including political and social factors) this has never been enforced. In order to focus attention and action on heritage buildings, recent initiatives such as that of INTACH and various other environmental organisations that have pushed for a separate Heritage Act/Regulations, would be helpful. However, this requires help from administrative and legislative quarters, as well as adequate support from the judiciary. It can provide the impetus and ideology for a conservation-oriented development policy, which seems to be the need of the hour.

A decentralised administration with more power to the local authorities can go a long way in preserving local architecture. There is a need for local bodies to share a greater responsibility in heritage preservation. It is also important to garner popular support and inspire the society overall to take conservation more seriously. The government and corporate enterprises, apart from policy support, could be the source of grants for restoration and maintenance.

It is often presented and is a quite commonly observed and seen practice that, while the economic value of a building attracts developers and decision makers, its cultural value is not recognised many a time. In contrast, conservation is a practice that protects and enhances the cultural value of a building. It places value on the building and not on the land on which it sits. For these reasons conservation is often misunderstood as an antithesis of development. Conservation offers an alternative paradigm for development; and while this idea has been clearly understood and accepted in environmental realms, it is unfortunate to say that it still awaits recognition in fields of architecture and town planning.

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10 As seen in the case of United States of America.
7. References and Recommended Readings


Savage, George (2008), *interior design*, Encyclopædia Britannica.


