

Mixed Landuse Practices and Implications

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Abstract: Mixed landuse is propagated by saying it leads to social benefits such as urban vitality, social cohesion, effective use of utilities, proximity of commercial needs and services etc. If not enforced to optimum level of correct typology mixed landuse would hamper the quality of life as it would attract undesired traffic and visitors creating noise and safety issues. Models of mixed typology identification is understood and applied in a small study area of Pune, Maharashtra and its implications on the quality of life of the residents is studied. Similarly, the implications of introducing mixed landuse policy in Delhi is studied through literature. Inferences are drawn regarding mixed use practices over the world how the negative effects mixed landuse can be reduced while retaining the benefits.

Index Terms: Mixed Landuses, Typology, Regulations, Quality of Life

I. INTRODUCTION

Mixed landuse is one of the modern planning paradigms which has its origin in Jane Jacob's critic that 'Fine grain mixing of diverse uses create vibrant and successful neighborhood' (Jacobs, 1961). Mixed landuse is propagated as a key feature in many of today's urban development concepts like smart growth, transit oriented development, walkable city, compact city etc (Kajtazi, 2007). Mixed landuses are believed to have many a social benefits such as urban vitality, social cohesion, effective use of utilities etc. These can be elaborated as mix creates an urban environment active at all hours, making optimum use of infrastructure; there could be greater range of housing options (rather than just detached homes); mixing housing types could increase affordability and equity by reducing the premium that exclusive, segregated areas enjoy; By providing housing near commercial and civic activities, planners could reduce the dependency of the elderly and children on cars; Enabling people to live near places where they can shop, work, or play could reduce car ownership and vehicle trips. Increase pedestrian and transit use, and thus alleviate the environmental consequences associated with automobile use (Jill, 2005). These benefits will manifest only if implemented in optimum levels and ways according to ideological typology.

In case the optimum levels are not met mixing landuses could also create certain disadvantages such as that of privacy, environmental quality, the noise, disturbance, rubbish and litter, limited open space, inconvenient parking restrictions. As most of the mixed use areas are located in city centres, residents trade off these lacunas against the overriding benefits of location and vitality (Foord, 2011).

There are a near infinite amount of possible mixed-use configurations and characteristics. Different representations of land use diversity may impact the association between neighbourhood design and specific behaviours. This lack of monotony in theory makes the practice of mixed land uses complex with difficulty in system of land use regulations, construction guidelines, financial underwriting standards and other processes (Manaugh, 2013).

II. CONCEPTUALIZING MIXED LANDUSES

Mixed use has been defined in various ways in literature. While some define it in dimensions to which compatible uses co-exist while others define it in terms of the effects it have. Some of these definitions are as below:

1. It allows compatible land uses to locate in close proximity to one another and thereby decrease the travel distances between activities. Mixed land use indicates the diversity of functional land uses such as residential, commercial, industrial, institutional, and those related to transportation (Thwaites, 2007).
2. Good mixed-use can be defined as a finely grained mix of primary land uses, namely a variety of housing and workplaces with housing predominant, closely integrated with all other support services, within convenient walking distance of the majority of the homes (URDPFI, 2014).
3. Landuse mix can be defined in three dimensions: one: increasing intensity of landuse with different forms and tenures. Second, increasing diversity of uses by encouraging compatible mix. Third, integrating segregated uses (Jill, 2005).
4. The complexity of space, activity, scale and time of multifunctional (mixed) land use by prioritizing two processes: an increase in spatial heterogeneity over time and the 'economies of synergy' emerging from relationships between coexisting land uses (Rodenburg, 2004).
5. The core components of mixed landuses are: The project must consist of multiple uses that are physically and functionally integrated and which are substantial enough to attract their own markets, the project must maximize space through intensive land use and be oriented toward the pedestrian, each component of the project must conform to an overarching, coherent plan (Herndon, 2011).

III. AMERICAN PRACTICE OF MIXED LANDUSES

USA's zoning system of controlling landuses can be categorized as hierarchical and non-hierarchical based on how mixed uses are allowed.

Hierarchical Zoning: The land uses form a pyramid. Residential uses made the top of the pyramid, while industrial uses made the bottom. Residential uses could locate freely in all zones that were below them in the pyramid (i.e., in business and industrial zones), but non-residential uses could not be built in the residential zones.

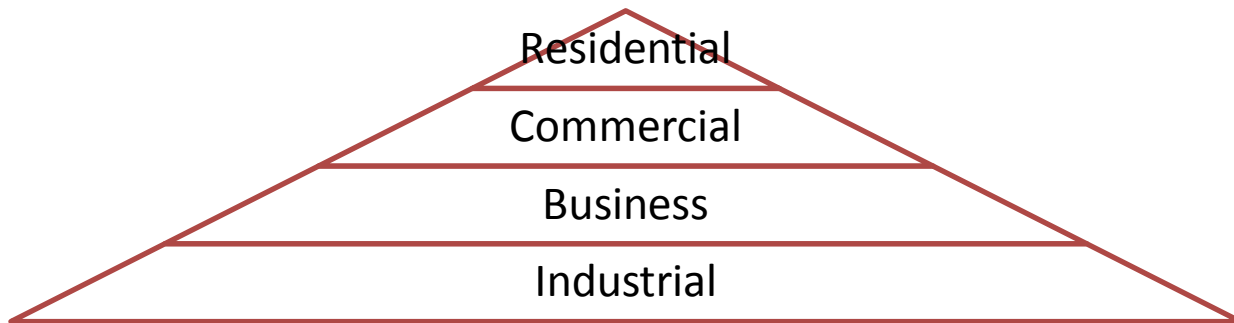


Figure 1 Hierarchical Zoning

Non-Hierarchical zoning: the standard classes of districts are: residential, commercial (often split into retail and office), industrial and agricultural. Public uses are often conditionally listed in the other zones. The classes are normally subdivided into sub-classes; e.g., residential classes branch into one-family, two-family and multi-family ones. Regarding each land-use district, the zoning code typically specifies the primary (or by-right) permitted uses, the accessory uses (which are closely related to the primary uses; e.g., garages in residential zones), and the conditional uses (e.g., civic buildings in residential zones). The mix is very restricted, and it may occur only as non-conforming use, at the border of neighboring districts, or in a special mixed-use zone. In both hierarchical and non-hierarchical codes, however, the single-family zones ban all other major uses.

While single-family zones occupy by far the largest share of territory in any U.S. metropolitan area, they typically ban all other main land uses and are almost immune to variances or re-zonings allowing for land-use change. In short then, American zoning separates uses quite strictly. (Hirt, 2010)

IV. GERMAN PRACTICE OF MIXED LANDUSES

Contrary to American practice, German regulations focused on bulk and density. German planners rarely prohibited all industry from residential areas; rather, they permit it under performance standards. Historically German codes commercial uses were permitted in all parts of town; they were banned amid residences only if they released noxious fumes. Single- and multi-family dwellings were almost always allowed to co-exist freely;

Municipal land-use regulation in Germany is guided by a federal statute: the Federal Land Use Ordinance. This lists four land-use classes: residential, mixed, commercial and special. These are divided in ten subclasses: small scale residential, exclusively residential, general residential, special residential, village type, mixed-use, town-center, commercial, industrial and special districts. »Small-scale residential« areas may allow the following uses by right: single- and two family homes, farms, small shops, restaurants, crafts, and non-disturbing industry. The »exclusively residential« areas, despite their name, permit by right all dwellings (without distinguishing between single- and multi-family) but also list small shops, crafts, hotels and civic buildings as special uses. Thus, no area is envisioned for only singlefamily houses. There is no residential-only category. The guiding principle is that at least 50 percent of the land in residential zones should be occupied by dwellings.

Mixed use is not mandated. The urban outskirts often end up dominated by mono-functional campuses. it gives locales the flexibility to place additional restrictions (Hirt, 2012).

Case of Mixed Landuse in Kreuzberg, Berlin, Germany

Berlin has categorized residential areas in various typologies like traditional building blocks, 5 floors or more, inter-war and post-war blocks of flats, 3-5 floors (also large housing estates, including high rise buildings) etc. Similarly mixed use is also of two types based on intensity. In such areas GF has to be retail with 20% as residential area. The Traditional mixed use types like that of Kreuzberg have use varying with courtyards. Front as residential, then poorer housing while back as industrial.

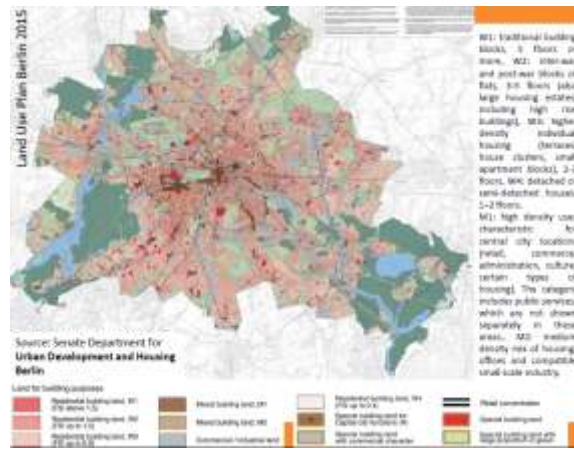


Figure 5 Mixed Landuse Practice in Kreuzberg, Berlin



Kreuzberg is a densely populated, especially the area along the wall with old building structures with traditional mixed use. It faced the issues of noise and air pollution from industries. It also had high residential percentage. Before felling of the wall, plans of demolition were in place which was faced with protests (community and squatter movement).

It was decided that the demolition will not take place and instead a careful urban renewal in 1970s was carried out. Small shops and industries were retained. Laws of mutual consideration were in place other laws like those of environment etc should be abided with. The place got green areas, upgraded infrastructure and urban design. The ownership retained. As there is competition from office use because of rental values light industries are supported by government. (Coupland, 2004). Thus overpowering environmental laws keep check of the negative effects of mixed uses.

V. CASE OF MIXED LANDUSE IN CLERKENWELL, LONDON

Clerkenwell is a densely populated mixed-use area located in north London. A study with detailed land-use analysis, interviews with households and a survey of businesses challenges key assumptions of mixed landuses. It suggests proximity of uses and integration within networks of urban physical, social and economic infrastructure are central to successful mixed neighbourhoods. The compatibility of activities and traders was found to be critical in fostering appropriate levels of vitality.

For most ordinary residents of mixed-use and areas it is the everyday services and facilities which are valued most: local shopping, services and amenities including open space/ parks, local leisure and entertainment, clinics, pubs, cafes and cinemas. 10% people rated environment quality as poor where as 20% rated as excellent. The trade-offs are over-crowding, increased environmental wear and tear and conflicts over parking traffic and noise. Jobs rarely found in same neighbourhood. Use of public transport due to geographic location.

Most residents simply tolerated mixed-use rather than actively engaged with it. Residents trade-off the noise, disturbance, rubbish and litter, limited open space, inconvenient parking restrictions and low levels of local community cohesion against the overriding benefit of Clerkenwell’s location on the edge of central London and its permeability (Foord, 2011).

VI. INDIAN PRACTICES OF MIXED LANDUSES

As per URDPFI guidelines, mixed use is to be carefully allowed along with the compatible uses only. The approaches for promoting mixed use development can be by increasing intensity of land use, increasing diversity of land use or integrating segregated uses. The key parameters for integration of different uses can be:

The functional and physical integration of different uses such as Residential, Commercial – Retail & service and Public Semi Public – offices ; Integration of three or more significant revenue producing uses.

In an urban space, mixed use development can be planned at selected locations, such as a) City or town centres comprising the commercial and civic core of town and cities, b) Inner city areas and c) Peri-urban locations and greenfield sites in urban fringes (URDPFI, 2014).

VII. PRACTICE IN DELHI

The mixed use regulation was introduced in 2006 to prevent the sealing and demolition of lakhs of commercial establishments operating illegally in residential areas that had come up due to market demand. As per Master Plan of Delhi (2001), certain mixed use is allowed in the residential areas certain portion of FAR adjoining roads of minimum widths. Retail shops (except hazardous, nuisance causing) on ground floor, professional offices on any floor and nursing homes, guest houses and banks have been permitted in residential areas where as retail shops selling building materials, repair shops, service shops, storage, manufacturing, junk shops are prohibited.

Due to the superimposition of mixed landuse into already existing societies certain **problems** are faced by the residents. The hustle bustle of mixed landuses was not desirable to many who were used to the clam of residential societies. For them the social fabric is messed up and residential character is destroyed. Enforcement is an issue as the quantum and form of commercial uses could not be controlled leading to rampant commercialization. It also led to encroachments. Residential areas became non-walkable due to increasing traffic. Conversion charges collected but basic services like parking is not provided. Trade license is not easily available so shops remained unoccupied and became den for antisocial activities. Existing residential areas can't take the superimposed load due to limited infrastructure and road width. Services are not upgraded to accommodate mixed developments. External laws like noise and pollution level are not in check and hence environment is affected unlike in Germany. Affordability of housing is reduced due to rental competition. (Chitlangia, 2015)

VIII. PRACTICE IN PUNE

In Pune Development Plan 2007-2027 there is no separate zone of Mixed Landuse. However mixing of land use is permissible in most zones under certain norms like limit to usage of electric power. It can be said that Pune Development Plan demarcates landuse zones based on predominant use. Moreover, certain usages are permitted based on the width of adjoining road. Commercial uses and services like clinics, offices, police chowki, bakeries, malls garages etc are permitted in predominant residential areas. In commercial areas all uses of residential areas are permitted along with larger stores, non-polluting manufacturing units etc.

As almost all kind of commercial uses are permitted in residential areas, access to services is deemed to be good. But the number of visitors of an area in addition to residential population is not in check and hence could have certain negative externalities. The mixed landuse trends and its effects are studied in a locality of Pune with the help of mixed use models.

IX. MIXED USE MODELS

To understand how mixed uses affect its surrounding it needs to be classified in terms of typology. combinations of the parameters of mixed uses can be many and hence needs to be defined. It can be classified into social, Economical, Temporal and physical mix. Social mix comprise of Income, Tenure and Lifestyle. Economic mix comprises of industrial and commercial activities. Physical mix comprises of Land use, amenities and open spaces. Temporal mix comprises of 24 hr economy, shared use of premises and street market. It can also be defined in terms of scale i.e. building level (such as the multifunctional buildings), street level (different buildings, located on a street, with different functionalities and ward level (coexistence of residences, shops, schools, offices, recreational areas, and industries). (Thwaites, 2007). Rowley's model and Hoppenbrouwer and Louw's mixed use models give the parameters based on which the mixed landuses can be categorized.

Rowley's Model for Mixed Landuse Typology: As per this study mixed-used development is essentially an aspect of the internal texture of settlements. The physical form of mixed-use development is a function of urban texture, setting, and location. Aspects of mixed landuses considered in this study are: Urban texture comprises of grain, density, and permeability. Spatial scale comprises of buildings, blocks, streets and districts. Location whether city/town centres (commercial and civic core), inner-city areas(built-up land needing regeneration), suburban locations; and greenfield sites (urban fringe) play important role. Public policy in terms of regulations, property markets, cultural ideas and values influence the form of mixed use. Activities and land uses within mixed-use projects generate different degrees of vitality. Time dimension as different uses produce activity on varying time schedules. (Alan, 1996).

This model does not consider high rise mixed use or building level mixed use which is catered to in Hoppenbrouwer and Louw's Mixed-Use Model.

Hoppenbrouwer and Louw's Mixed-Use Model: In this model the mixed landuse characteristics are organized by **function** i.e. Landuses, dimension i.e. whether Shared, horizontal, vertical, time, scale i.e. Building, Block, District, City along with the previous mentioned parameters of urban texture (grain, density and interweaving), location and other features like security, public private ownership, nature of use, housing type etc.

Hoppenbrouwer and Louw's Mixed-Use Model is different from Rowley's model in its consideration of dimensions (Hoppenbrouwer, 2005). The following diagram explains this consideration of dimension.

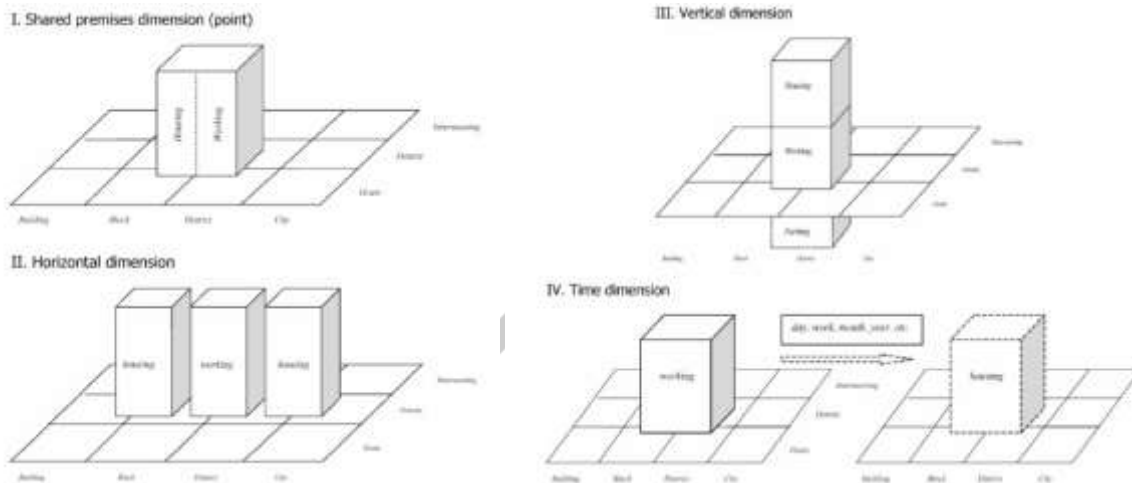


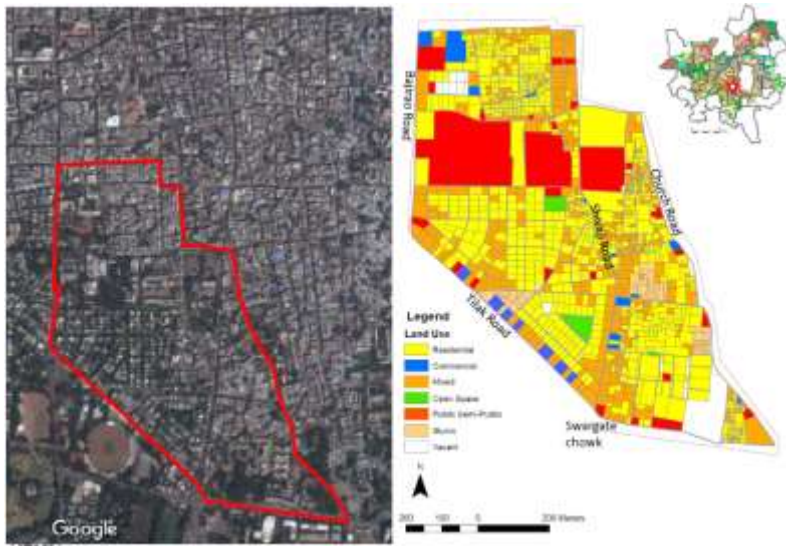
Figure 2 Dimensions of Mixed Landuse Model

X. INTERPRETATION OF MIXED LANDUSE MODELS THROUGH FIELD STUDY

In Indian context a particular location with a certain urban texture, can have various mixed-use typologies which are a permutation of functions and dimension. Increase of scale will lead to increase of complexity. Typologies could be: GF commercial above residential, GF commercial above offices and then residential above, completely residential building with commercial/ office within premises, commercial/ institutional in adjoining plots of residential plot, dispersed commercial, mixed use (plots), residential plots, almost all plots have mixed use buildings etc.

The model is applied to a pilot study area and typologies are identified.

Location of Study Area: For the purpose of the study a ward of Pune city, India was selected. The study area is bordering the old city area (developed pre-independence) and hence shows characteristics of organic growth, redevelopment and early planning. Owing to its location the roads around it serve as a commercial destination and link major landmarks. Hence under the current regulations it has a market demand of commercialization.



Land Use Map Source: (Local Area Planning Lab, 2016)

Figure 3 Location of Study Area

Parameters as per model:

Function: Residential, Commercial, Offices, Institutions | **Urban Texture:** Fine grain, dense, organic interweaving | **Dimension:** Shared, Horizontal, Vertical | **Location:** City Center : **Scale:** Building, Plot Level, Street Level, Ward Level : **Other Features:** Close to major transport terminal

Typologies Identification

Residential near institutional area



Completely residential bungalows with commercial within walkable distances



Completely residential apartments with commercial within walkable distances



All plots mixed use along entire street

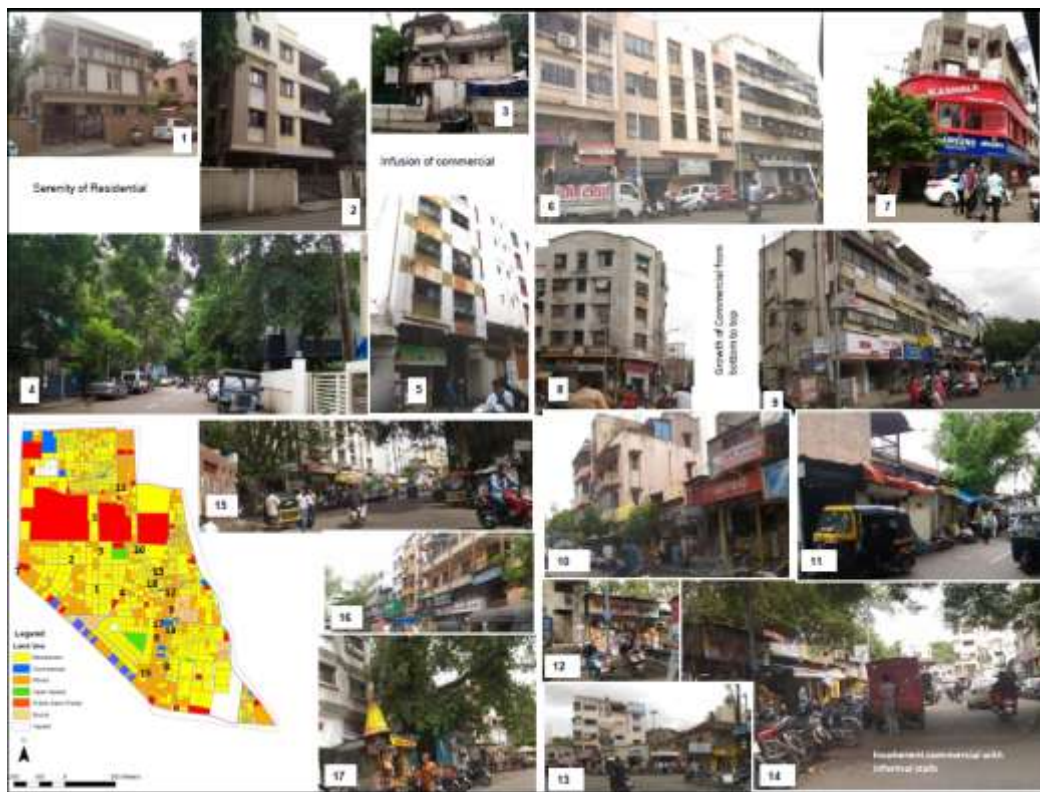


Dispersed Commercial in form of mixed use buildings in residential



Figure 4 Mixed Use Typology Identification

Similarly changing functions and dimensions at plot level an locality/ neighbourhood level would lead to a different mixed use typology



In the Pilot Survey it was found that residential areas near major commercial areas (which serve at city level) face rampant commercialization with G.F. being frequently converted/ planned as commercial. The subsequent floors are in competition with residential renters and offices. As offices can afford more they are converted into offices and clinics. This creates some problems for the remaining residents of the building like Maintenance, Security of children, Litter, Sanitation etc.

The Pros were found to be:

- Easy Access to local shops
- Access to schools and other services
- Access to public transport (at least IPT)
- Major Mixed use areas are mostly on prime locations and arterial roads in the city making access to work place easier
- Vibrant street front
- Increase in Property Value

The Cons were found to be:

- Increasing demand of parking (parking in front of residential houses)
- Non-walkability of residential roads due to traffic and encroachments
- Noise pollution
- Low road safety, low security
- Increased number of stakeholders
- Cropping up of quasi legal commercial shops
- Semi-permanent commercial shops which can become nuisance spots (like cigarette shops, tapri etc) and informal stalls
- Difficult to control types of commercial
- Construction of inefficient housing and building (lack of ventilation)
- Not really social mix as certain category of people avoid such areas
- Shops many times do not serve local needs.
- Even in areas where G.F. is originally planned as commercial, the above floors face conversion threats while in some areas due to low demand the shops remain unoccupied and den of antisocial activities.

As was the case of Clerkenwell, London here to people tolerated the disadvantages of mixed landuses due to location advantages. Presences of commercial shops and offices has increased the property values there by leaving a lot of them unaffordable for renting families.

XI. CONCLUSION

Unless the externalities of mixed land uses are regulated like in case of Germany, the advantages of mixed land uses will be demeaned. Quantum of mix if left to market forces would lead to rampant commercialization in some areas thereby adversely

affection the quality of life of the residents. Regulations that go by predominant uses defect here as whether the non-predominant use is of actual use to the neighbourhood residents or not is a question. Forecasting infrastructure requirement for mixed use areas which has uses catering to areas outside neighbourhood is difficult. This results in unprecedented visitors to the area affecting the residential character due increased traffic, and hampering safety. Hence complimentary use (which are actually required by the residents regularly) in residential areas needs to be specifically defined and not in terms of certain prohibition. Additionally it has to be made sure that these complimentary uses adhere to other regulations like that of environment and parking.

Non-planned or converted mixed use (residential buildings which are later used for commercial/ institutional purposes) cause additional problems as they are not designed for such uses and lack the required infrastructure or maintenance system thereby becoming nuisance for the residents. Left to market forces, while the property owners get the economic benefit of housing other uses, the other residents are at a disadvantage due to the frequent visitors, noise, parking shortage etc. Hence conversion or change of use needs to be strictly regulated to check the presence of required infrastructure like parking, toilets etc so that the quality of life does not deteriorate. To reap the benefits of service proximity of mixed land uses, it needs to be well regulated in terms of its typology, kind of use, quantum of use, supporting infrastructure and environmental compliance.

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