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Land Use Conversions in Peri-Urban Areas

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Abstract

Peri-urban areas represent transitional zones where rapid urban expansion intersects with rural livelihoods, agricultural systems, and fragile ecosystems. In India, accelerating urbanisation has intensified land use and land cover (LULC) changes in these zones, particularly the conversion of agricultural land into residential, commercial, industrial, and mixed-use developments. This paper examines the drivers, patterns, and impacts of land use conversions in peri-urban areas, with a focus on socio-economic, environmental, infrastructure, and employment dimensions. Using secondary data, GIS-based LULC studies, and selected Indian case examples—Delhi NCR and Bangalore—the study highlights how fragmented governance, speculative land markets, and inadequate planning frameworks exacerbate unsustainable peri-urban growth. The findings indicate that while land conversions generate economic opportunities and infrastructure expansion, they also result in declining agricultural land, environmental degradation, social inequities, and informal development. The paper argues for integrated peri-urban land-use planning, strengthened institutional coordination, and the adoption of spatial tools such as GIS and land change models to ensure sustainable and inclusive urban transitions.

Keywords: Peri-urban areas, Land use conversion, LULC, Urban sprawl, Agricultural land, India

Introduction

Land use conversion refers to the transformation of land from one designated use to another, such as the conversion of agricultural land into residential, commercial, or industrial uses. In peri-urban areas—zones located at the interface of urban and rural landscapes—such conversions occur at an accelerated pace due to urban expansion, infrastructure development, and changing economic dynamics. These areas are neither fully urban nor purely rural; instead, they are hybrid spaces characterised by overlapping land uses, competing stakeholder interests, and weak regulatory control.

Peri-urban areas play a crucial role in regional sustainability by supporting food systems, ecological services, and rural livelihoods while simultaneously accommodating urban growth. However, managing land use in these transitional zones remains one of the most complex challenges for planners and policymakers. As cities expand beyond their administrative boundaries, peri-urban regions often fall outside formal planning jurisdictions, resulting in unregulated land conversions, informal settlements, and environmental stress.

In India, rapid urbanisation, population growth, and economic restructuring since the 1990s have intensified peri-urban land transformations. The conversion of fertile agricultural land into built up areas poses serious concerns for food security, environmental resilience, and socio-economic equity. Against this background, this paper investigates land use conversions in peri-urban areas, focusing on their drivers, impacts, and governance challenges.

Aim and Objectives

Aim

To examine the impact of land use changes or conversions in peri-urban areas. Objectives To analyse spatial and demographic growth trends influencing peri-urban expansion To assess land use and land cover (LULC) changes using secondary GIS-based studies To evaluate socio-economic, environmental, infrastructure, and employment impacts of land conversions

To identify governance and planning challenges in managing peri-urban growth 3. Conceptual Background and Literature Review

Peri-urbanisation is widely understood as a process through which rural landscapes are transformed under urban influence. Scholars describe peri-urban areas as contested spaces shaped by urban sprawl, land speculation, and shifting livelihoods. Tacoli (1998) emphasises that these zones exhibit unique socio-ecological dynamics that differ from both urban cores and rural hinterlands.

Land use and land cover change (LUCC) has been recognised as a major driver of environmental change at local, regional, and global scales. Studies by Lambin et al. (2001) and Millennium Ecosystem Assessment (2005) highlight how LUCC affects biodiversity, hydrology, soil quality, and climate systems. In developing countries, peri-urban land use change is particularly pronounced due to weak governance and rapid demographic transitions.

Indian studies on peri-urbanisation, especially in regions such as Delhi NCR, Bangalore, and Kolkata, reveal consistent patterns of agricultural land conversion, informal settlement growth, and infrastructure deficits. Researchers point out that fragmented institutional frameworks and overlapping jurisdictions between urban local bodies, development authorities, and rural panchayats contribute to unplanned growth. Despite

increasing academic attention, peri-urban land management remains under-theorised and poorly integrated into statutory planning systems.

Methodology

This study adopts a qualitative and analytical approach based on secondary data sources. The methodology includes:

 Review of academic literature, policy documents, and planning reports Analysis of GIS-based LULC studies and satellite-derived findings from existing research

 Comparative assessment of selected case studies (Delhi NCR and Bangalore) Thematic analysis of impacts across socio-economic, environmental, infrastructure, and employment parameters

Land change modelling (LCM) and GIS-based monitoring tools discussed in the literature are used conceptually to understand land transition dynamics.

5. Drivers of Land Use Conversion in Peri-Urban Areas Several interrelated factors drive land use conversions in peri-urban regions:

1. Urban Expansion and Population Growth: Cities expand beyond their boundaries, encroaching upon rural and agricultural land.
2. Economic and Real Estate Pressures: Rising land values encourage farmers to sell land for speculative development.
3. Infrastructure Development: Highways, metro corridors, airports, and industrial estates act as catalysts for land conversion.
4. Policy and Governance Gaps: Weak enforcement of land regulations and lack of peri urban planning frameworks.
5. Changing Livelihoods: Declining agricultural profitability pushes rural households toward non-farm income sources.

Impacts of Land Use Conversions

Socio-Economic Impacts

Land conversions often generate short-term economic benefits through real estate development, construction activity, and service-sector growth. However, they also displace farming communities, increase land inequality, and intensify socio-economic disparities. Informal settlements frequently emerge as low-income migrants seek affordable housing in peri-urban zones.

Environmental Impacts

The conversion of agricultural land, wetlands, and open spaces leads to loss of biodiversity, disruption of natural drainage systems, and increased flood risks. Declining vegetation cover and soil degradation further weaken ecological resilience in peri-urban areas.

Infrastructure Impacts

Rapid and unplanned growth places immense pressure on infrastructure systems. Roads, water supply, sanitation, and public transport often lag behind development, resulting in congestion, service deficits, and environmental pollution.

6.4 Employment Impacts

While land conversion generates employment in construction, real estate, and industrial sectors, these jobs are often informal and lack long-term security. Traditional agrarian livelihoods decline, leading to occupational shifts that may not guarantee stable incomes.

Case Studies

7.1 Delhi National Capital Region (NCR)

Delhi's peri-urban areas have experienced extensive conversion of agricultural land into residential colonies, commercial hubs, and institutional developments. Fragmented governance, speculative real estate practices, and weak enforcement of master plans have contributed to unregulated growth. Although policies such as land pooling were introduced to manage peripheral development, implementation challenges persist. The result has been shrinking agricultural land, proliferation of informal settlements, and infrastructure stress.

7.2 Bangalore Peri-Urban Region

Bangalore's peri-urban belt has been reshaped by IT-led growth, industrial corridors, and airport centric development. Studies indicate that a significant proportion of agricultural land has transitioned to mixed-use and commercial development. While this has boosted regional economic growth, it has also reduced green cover, strained water resources, and displaced traditional farming communities.

Discussion

The analysis reveals that peri-urban land use conversion is not merely a spatial process but a socio-political phenomenon shaped by governance structures, market forces, and institutional capacities. The lack of integrated regional planning allows piecemeal development to dominate peri-urban landscapes. Without proactive intervention, peri-urban areas risk becoming zones of environmental degradation and social exclusion.

Way Forward

To achieve sustainable peri-urban development, the following measures are essential:

Extension of statutory master plans to peri-urban regions

Strengthening coordination between urban and rural governance institutions Protection of agricultural land and ecological assets through zoning regulations

Adoption of GIS-based monitoring and land change models

Participatory planning involving local communities and landowners

Conclusion

Land use conversions in peri-urban areas are an inevitable outcome of urban growth, but their impacts depend on how they are managed. The Indian experience demonstrates that unregulated conversions lead to environmental degradation, loss of agricultural land, and socio-economic inequities. A shift toward integrated, inclusive, and evidence-based planning is crucial to balance development needs with sustainability goals. Peri-urban areas must be recognised as distinct planning domains that require tailored policy frameworks rather than being treated as residual spaces of urban expansion.

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