Shiv Shakti International Journal of Multidisciplinary and Academic Research
ISSN: 2278-5973 (Online) | Vol. 13, No. 2, (March 2025)
DOI: https://doi.org/10.5281/zenodo.15154295

A Retrospective Perspective on Peri-Urban Dynamics: Environment, Society and Economy

Vishaal. K
Doctoral Fellow, Department of Economics
Central University of Tamil Nadu, Thiruvarur, India- 610005, vishaalkamalakar94@gmail.com

Introduction

The structure of population growth varies extensively among different countries. It relies on numerous factors, including climate, livelihood opportunities, sociocultural dimensions, and the population policies of the government. Similarly, the differences in determining the spatial pattern of growth (rural, semi-urban, peri-urban, urban, cosmopolitan) too, are influenced by numerous factors. Each region has its own amalgamation of opportunities, challenges, issues, and solutions. For example, although cities tend to grow over a while, they do not grow uniformly at the same rate due to various factors (Gilles Duranton and Diego Puga, 2013). Among the different locations (rural, semi-urban, peri-urban, urban), the 'Peri-Urban Interface (PUI)' tends to have a major focus as its nature of growth and development is both complex and dynamic.

Definition of Peri-Urban

UNESCO defines 'Peri-Urban' as "areas or zones of transition from rural to urban land uses located between the outer limits of urban and regional centers and the rural environment." Webster and Muller (2004) consider the growth of PUIs as functional and physical incorporation of rural systems into the urban structure. The patterns of peri-urbanization have both similarities and differences between the developed and the developing third-world countries. The most assertive phenomenon in the developed world is the attraction of economic growth leading to urban and peri-urban growth. In the case of developing countries, the lack of development and shrinking of livelihood opportunities in the rural areas lead to the expansion of PUIs. That is, migration coupled with low cost of living leads to the growth and expansion of PUIs. In this context, Adam (2014) points out that PUIs possesses characteristics such as shortage of land, weakening of traditional institutional framework leading to legal conflicts, and an informal way of dealing with livelihood issues.

Conceptualization of Peri-Urban Interface (PUI)

Adell (1999) in his detailed review of 'Theories and Models of PUIs, argued that the conceptual issues regarding PUIs have been overlooked, as the objectives of the research works have been general. However, it is necessary to assess the conceptual legitimacy of situating PUIs in the extensive field of rural-urban linkages and spatial networks. Ravetz, Fertner and Nielsen (2013) conceptualized 'PUI' as "a new kind of multi-functional territory." The rural-urban interaction became an old concept and new terminologies like *rurbanization, peri-urbanization,* urban-rural dichotomy, rural-urban continuum, and PUI are widely used and discussed.

While describing both peri-urban linkages and institutional connections, Iaquinta and Drescher (2000) established five types of PUIs namely, village PUI, diffuse PUI, chain PUI, in-place PUI, and absorbed PUI. This typology has been derived from the underlined sociodemographic processes, especially migration. The authors argued that this new definition would help in identifying the institutional framework and also relevant networks in different PUIs.

The conceptualization of peri-urban landscape has been taken up by Mrinalini Goswami (2018). Following a brief analysis of the challenges of peri-urbanization and its impacts, and a review of

Corresponding Author: Vishaal. K, vishaalkamalakar94@gmail.com

literature in the Indian context, the author called for an integrated landscape approach. A basic conceptual framework was developed with a step-by-step approach and suggestions were given, to develop a policy for management in the form of five modules.

Dimensions of Peri-Urban Growth

A. Spatial:

The spatial dimension is a prominent approach to study the process of peri-urban growth. It involves describing multiple amalgamations of urban areas with peri-urban agglomeration and rural hinterland. This dimension studies the issues such as displacement, land market and land use change, settlements, resettlement, and compensation.

B. Temporal:

The changes/dynamism in the growth of urban PUIs can be measured in the form of physical change over a specified period, in this specific dimension. Topics like planning and development, production systems, sustainable development, and creation and utilization of infrastructural facilities, can be covered to determine the temporal shifts.

C. Social:

The social dimension calls for the inclusion of community-related variables in peri-urban growth and impact analysis. It includes age, gender, community, religion, health and education. The scope of this dimension is wider, as it encompasses themes like social capital, community ties, livelihood decision-making, poverty, voluntary associations, organizations and institutions.

D. Economics:

The economic dimension focuses on the impact of urban expansion on occupational structure, ownership of property and assets, employment, income and housing, and living conditions of the stakeholders. Investment, cost, returns, workforce, wage structure, cost of living and the like, are brought under this dimension.

E. Environmental:

The primary focus of environmental dimensions of peri-urban studies includes environmental quality (air, groundwater and surface water quality); natural resource use; exploitation of forests, mangroves and wetlands; and loss of biodiversity. It also covers pollution, polluters, regulators, and the participation of individuals and institutions in sustainable development, energy and environmental preservation.

Further, the peri-urbanization in the form of the above five dimensions brings out both positive (merits) and negative (demerits) outcomes. The following section depicts the merits and demerits of the process of peri-urbanization.

Peri-Urbanization: Merits and Demerits

As the first step, when urbanization happens in the peripheral regions of cities, it leads to growth in employment opportunities. Such growth happens due to the expansion of industries, small-scale businesses and manufacturing, and infrastructural facilities (Mondal and Banerjee, 2021). Further, expansion of non-agricultural economic activities leads to an increase in the level of infrastructural investments, and directly productive activities. The above two positive impacts show the livelihood transformation of local communities from traditional economic activities to the manufacturing and service sector activities (Toku et al., 2024).

The above infrastructural transformation especially in transportation, increases the cohesion between urban and rural zones, through different networks such as railways, roadways etc (Haldar et al., 2023). These transformations in terms of transportation lead to an increased accessibility to hospitals, schools, colleges and other educational facilities (Khanani et al., 2020). These lead to further inclined construction of housing facilities for residential purposes (Aijaz, 2022). Since there is a large availability

of land at low prices in the PUIs, the prices of housing are also affordable, especially for poor people (Kombe, 2005; Davies and Fourie, 2002). The driving factors behind all the above transformations have been the existing lower density of population and vacant land, at PUIs.

The affordable housing facilities, accessible transportation and other infrastructural facilities, increase the likelihood of peri-urban residents to explore amenities and job opportunities present in the urban regions. The enhanced connectivity with urban regions further brings out an exchange of culture in the PUIs (Kobzeva and Knickel, 2018). Further, these enhanced transportation networks and infrastructure lead to linkage effects in terms of the economic dimension. The above mentioned linkage effects are the growth and development of agro-industries and agro-markets, that could positively impact the livelihoods of farmers (Toku et al., 2024; Webster and Muller, 2004). Further, there could be positive environmental externalities, if the process of peri-urbanization occurs in an organized/planned manner. A planned peri-urbanization could build infrastructures that are environment-friendly. Some of the environment-friendly infrastructures are green zones (community gardens, parks etc), afforestation, rainwater harvesting, renewable energy, and renewable energy-based transportation networks etc (Hapriyanto and Azmi, 2025; Shehata, 2018; Teston et al., 2022; Environmental and Energy Institute, 2018). The adoption of such environment-friendly infrastructure, facilitates the sustainability in land use, conservation of ecosystem, preservation of ecosystem services, and the achievement of environmental sustainability. All these together build 'Sustainable PUIs and Communities'. Further, a wisely planned peri-urbanization process, decreases the divide between urban centers and rural areas, especially in the aspect of standard of living (Abdulai, Enu-kwesi and Agyenim, 2020). This further leads to the maximisation of the socioeconomic welfare of local communities living at the PUI. Though planned peri-urbanization can lead to the above positive impacts, peri-urbanization in numerous PUIs at developing countries like Bangladesh, are basically unplanned, and brings negative externalities (Rahaman, Kalam and Al-Mamun, 2023). Especially, PUIs that are largely industrialized, have undergone unplanned and haphazard development.

The unplanned urbanization and industrialization in PUIs (largely informal and illegal) lead to the displacement of agricultural communities, decrease in the area of agricultural lands, deforestation, and land degradation (Seifollahi-Aghmiuni et al., 2022). Further, it leads to negative externalities like air pollution, which is not only a loss of environmental quality but a major public health issue (Paramanik and Paramanik, 2016; Rahaman, Kalam and Al-Mamun, 2023). Not only air pollution is caused by unplanned urbanization and industrialization in PUIs, but also other forms of environmental degradation such as groundwater, surface water, and land pollution (Ribeiro, 2021). All these in turn, lead to the loss of biodiversity and depressed ecological functions (Münzel et al., 2022; Saccò et al., 2023).

The first point of contact of the above issues, caused by unplanned urbanization and industrialization in the PUIs, is the unplanned and inefficient land use change. In general, rapid land use changes are caused by demographic factors/drivers like population growth, and push and pull factors (Rauws and de Roo, 2011; Appiah et al., 2014). The major push factor is the dearth of employment/job opportunities in the rural areas, that pushes the rural population to PUIs (Siyal, Khalid and Qaisrani, 2018; Selod and Shilpi, 2021). The major pull factors are abundant employment and high-income opportunities (Toku et al., 2024), and increased accessibility to infrastructural facilities such as quality education and healthcare (Gong et al., 2012). Since these factors lead to multiplies population growth in PUIs, the demand for basic needs such as water, energy and sanitation etc exceeds their supply (McConville and Wittgren, 2014). This causes scarcity of water, and negative human health and ecosystem impacts (Chettry, 2022; Moncaleano et al., 2024). This further slows down the process of economic growth and development (McConville and Wittgren, 2014). The population growth also impacts the transport and education infrastructure to a great extent. That is, population growth leads to high levels of traffic,

pollution from vehicles especially carbon dioxide emissions (Cao and Liu, 2024), and excessive demand for education services over the supply of the same (Wang et al., 2023).

In addition to conflicts and concerns studied above, peri-urban local communities experience exclusion in the decision-making power in terms of socioeconomic, political and land use dimensions (Damon, Marchal and Stebe, 2016; Bhanye, 2024). Such exclusion occurs mainly due to displacement from their geographical region. Further, it affects their livelihood too (Anane, 2022). These exclusions and loss of livelihoods lead to the marginalization of these local communities. Further, all these additional conflicts and concerns have been discussed from different perspectives in literature. The first and foremost conflict in the sphere of peri-urban issues can be looked at, from the rights perspective such as right to property, right to food, right to livelihood and the like. In the next level, the conflicts emerge from the perspective of sharing natural resources like water. Similarly, the concerns include equity, livelihood security, environmental quality, access to public utilities, labour welfare and so on. To put it succinctly, the issues can be classified based on the framework through which one investigates the matter. In the theoretical literature, the prominent theoretical frameworks in the realm of PUIs include:

i. Institutional Framework
ii. Legal/Rights Framework
iii. Livelihood Perspective – Sustainable Rural Livelihoods- Sustainable Livelihoods Framework - Sustainable Livelihoods Diamond- Household Livelihood
iv. Natural resource use and management- Ecological/ Environmental
v. Sustainable Development
vi. Economic Framework
vii. Social Capital
viii. Governance
ix. Community Field Perspective.

Depending upon the focus of the research, the framework must be decided and in turn the components/parameters are identified to have a scientific as well as logical analysis. Further, from the literature reviewed in this section, on the merits and demerits of peri-urbanization, the demerits of peri-urbanization outweigh its own merits. Especially at developing countries, the intensity of negative externalities or demerits seems to be higher than in developed countries. So, this retrospective perspective study thrives on to explore the case of peri-urbanization in India, which is a developing country.

Peri-Urbanization in India

Alike the pattern observed in developing countries globally, the Indian PUIs have realized a massive increased in their area, due to the growth of urban population, and push and pull factors from rural and urban zones to PUIs. This has further led to a rapid land use change in residential, commercial and industrial agglomerations. Further, a massive decline in the area of fertile agricultural land, most eco-sensitive wetland complexes, and waterbodies, has been a major concern at Indian PUIs (Mondal and Banerjee, 2021). This has led to the displacement of agricultural communities, and further resettlement in informal settlements that inhibit the provision of basic amenities and infrastructure, sanitation, and health care services etc. One of the reasons behind such negative impacts is the massive growth in real estate services and their associated development. Further, another inhibitor of achieving sustainability on PUIs is the industrial and sewage wastes.

For example, industrial and sewage waste emitted from the city of Patna, are accumulated in the low-lying spaces of its PUI. Due to such dumping of wastes, the Indian PUIs experience the serious issue of

groundwater pollution, as the infrastructure for sewage treatment is very poor in India. Guwahati experiences similar challenges due to its unique and rich environmental composition and structures. For example, environmentally productive and sensitive zones like waterbodies and agricultural lands have been encroached by large-scale residential complexes and polluted by industrial waste. This issue seems to have affected such a large population living in Guwahati. The local communities have been affected the most, in the form of displacement, effects on the plants and animals, impact on fishing and agriculture and its associated livelihood, and health issues.

In case of especially the PUI of Chandigarh, which tops of the list of most affected PUIs in India, the same pattern of issues has been encountered. The issues of the PUI of Chandigarh are,

1. Decline in plants and wetlands by more than 50%
2. Decline in the extent of agricultural lands and forests
3. Increased silting of waterbodies due to above losses
4. Decreased ecosystem health.
5. Increased siltation and land use transformations have decreased the area of peri-urban wetlands that are highly effective in controlling urban flooding by 65%.
6. Industrial waste dumping into surface water.
7. Contamination of aquifers

These challenges indicate that Indian PUIs experience issues similar to those experienced by the same in other developing countries, when it comes to the processes of peri-urbanization.

Literature Review

The above sections have dealt with issues of peri-urbanization within a broader perspective of peri-urban dynamics. Whereas, in this section, this retrospective perspective study identifies and explores the issues with increased depth, that too in a three-dimensional framework 'Environment-Society-Economy'. A brief note on studies related to the proposed research work has been prepared and presented here thematically.

Land Acquisition and Land Use Change

By applying spatial-heteroskedasticity and autocorrelation-consistent hedonic pricing model, Jimenez et.al. (2020) found that in the Mexico city, the land parcels' prices in the Conservation land were determined by structural features, environmental variables, neighbourhood characteristics, and accessibility attributes. The relationship between the land price and distance to the nearest forest or protected natural area was found to be positive.

Adam (2014) examined the peri-urban land tenure in Ethiopia. The results showed that local governments are keen on revenue maximization through expropriation, and then leasing peri-urban land without having due concern to the rights of local communities, in terms of land tenure. Due to lack of rent/lease affordability, urban poor have been pushed to informal settlements at PUIs. Further, the land rights were found to be in favor of the urbanites. The favoritism of urbanites over local communities, had encouraged the forceful occupation and illegal sub-division. This has resulted in the creation of informal land rights, which may be converted into formal rights in the process of formalization or legalization.

After a critical study on land tenure system in the Bahir Dar city at Ethiopia, Adam (2014) elucidated that illegal transfer of land rights had been unrestrained, and about 57% of the respondents had suggested either buying an illegally sub-divided piece of land or squatting on the state land, to be the viable ways to acquire a land plot. The author brought out also the following two dimensions of

involvement of local landholders in the illegal sub-division, and transaction of peri-urban agricultural land.

I. Growth in peri-urban demand for land, mostly from underprivileged sections of urban people.
II. Expectancy of expropriation by administrative authorities of the city.

Through the adoption of property rights approach, Adam (2014) examined the rural and urban landholding rights in Ethiopia. Since landholding arrangements in Ethiopia were found to have favored the urbanites over the local peri-urban landholders. The author feared that the latter being majoritarian, who are poorly educated, are realized at a greater risk of livelihood loss in the growth of urbanization. Thus, the process and implementation of urban development programs have higher chances of instigating tenure insecurity and land disputes.
In another article, Adam (2014) analysed the nature of informal settlements in the PUIs, to bring out the fact that role of a traditional social institution is quite efficient in resolving land conflicts. Further, the author had raised a few problems with reference to Ethiopia, and proposed/advocated a seven-stage 'Land Re-adjustment Tool/Model'. The land readjustment model at PUIs, stems from the fact that it must be a participatory as well as a negotiable tool that protects land rights of peri-urban local communities. Such a model can lead to planned development in urban zones.

The prominent issue in peri-urban growth has been the land acquisition for urban infrastructure development. Vishal Narain (2009) examined the formation of PUIs in the village 'Basai' situated in the Gurgaon district, Haryana. Through conducting interviews with 60 peri-urban residents and having key informant interviews and discussions, authors studied the land acquisition and land use change, structural transformation of occupation, and rural-urban linkages of the study-specific village. The findings of the study had indicated that due to the expansion of Gurgaon city over the last two decades, structural transformations of agriculture and occupation have largely been dynamic. Most of the people in the farming community had shifted their cultivation from commercial to subsistence farming. Similarly, the residents of this village had transformed their traditional occupation into the operation of travel and taxi services, and petty trade. Torres et. al. (2007) analysed the causes and environmental consequences of a PUI in the Sao Paulo Metropolitan area, Brazil. The causes listed were migration and transportation facilities, which favoured the poor and the uneducated settling down in the urban outskirts or peripheries. The environmental consequences were found related to transportation and pollution. Further, informal land markets had led to the emergence of informal settlements, which made the development a highly irregular one. The results showed that illegal occupation was pursued by almost 43% of the total population in the PUI of Sao Paulo. Kombe (2005) studied the land use dynamics in the PUI of Dar es Salaam, Tanzania. The land use change and its patterns were found to be largely influenced by social networks (local leaders), community level social institutions and brokers. The expansion of PUI of the city was found to be characterized by an increasing construction of houses, and a high level of informal land transactions. The author had concluded that the change in land use was from subsistence farming to informal housing settlements.

Lasserve et. al. (2007) had performed desk review of literature to study socioeconomic impacts of land titling programs at urban area and PUIs. Following the usual way, the social variables utilized were health, education, gender, fertility, mobility and spatial integration. The authors stated that the title has not either catapulted the integration of informal settlements into the formal market to benefit the urban and peri-urban poor or have guarded them from exploitation. Further, the economic impacts were analysed in view of investment in housing/property, property value, access to credit, income of the households, and employment. All these dynamisms in the pattern of 'Land Acquisition and Land Use Change' have led to differential patterns of rural-urban/peri-urban transition. This further presses the need to explore on the latter.

Pattern of Rural-Urban Transition

Webster and Muller (2004) described rural-urban transition zones in the given peri-urbanization context in three countries namely, Philippines, China and Thailand. The authors had explained that the patterns of peri-urban growth though look similar, have five major cross-continental peri-urbanization variants. They are differential drivers, economic systems, demographic patterns, historical backgrounds, and institutional structure.

Rodriguez et. al. (2021) elucidated that interdependence among ecological, social and economic patterns has to be framed while examining the environmental quality for achieving sustainability. The authors had propounded a qualitative model that had utilized core variables like built up land, agriculture, forest cover, and migration of the people. The employment of loop analysis was done to study the above. The focus was on the conservation of forests in the peri-urban Bogota, Colombia. After analysing the drivers of change in land cover like decline in soil fertility and migration, the authors had developed a path analysis and found that selected variables had a significant positive effect on forest cover. They also called for efforts of conservation to protect forests and preserve biodiversity and ecosystem services.

Simon (2008) discussed about livelihoods, planning and development, and production systems in the peri-urban fringe in general and particularly in China. The patterns that had indicated the growth of PUIs were the expansion of economic activities, industrialization and modernization. This catapulted conversion of land, especially in low and middle-income regions of China as well as in Africa, and South and South-east Asia. A common finding was that in the expansion process of urban fringe, cultivation becomes extremely complex, and the likelihood of land sale and cultivable land loss decreases the level of local food self-reliance. On the other hand, the greater proximity drives specialization of horticultural crops of higher value by a few farmers. Another observation was that the households of the poorest section were the least able to resist changes. Further, in the backdrop of lack of access to alternative resources or livelihood activities, those poor people became the victims of peri-urbanization.

The housing, settlement and re-settlement patterns were discussed by a few studies. Ayesha Saleem et. al. (2014) analysed housing structures at four PUIs of Faisalabad, based on the household data collected from 307 sample respondents. The housing conditions were studied by taking variables like housing types, size of the household, number of rooms, and other facilities. A relatively better housing conditions were found in the study area, due to the influence of urban characteristics.

The above peri-urban regional dynamics and its associated land acquisition and land use change, and differential patterns of rural-urban transition, leads to change in the pattern of agriculture in urban areas and PUIs.

Urban and Peri-Urban Agriculture

On behalf of the World Bank and the FAO, Hoornweg and Munro- Faure (2008) worked on the possibility and feasibility of Urban and Peri-urban agriculture (UPA) in alleviating poverty and ensuring food security. In their paper, a case analysis representing cities across globe was done to bring out UPA's significance. Along with this study, majority of studies that pertained to UPA reiterated the following.

a. Conversion of arable lands into housing colonies, settlements and industrial sites.
b. Cultivational shift of food crops into commercial crops
c. Shift from commercial farming to subsistence farming

d. Livestock loss due to the reduction in the spread of grazing land.

All these negative impacts mentioned in terms of environmental, social, economic, spatial and temporal dimensions, have been the negative consequences/externalities of peri-urbanization, that needs to be mitigated at source, to achieve sustainability and further build 'Sustainable PUIs and Communities'. The next section 2.4 illustrates the possibility of social capital and governance in mitigating the negative externalities of peri-urbanization.

Peri-Urban Interface- Social Capital and Governance

Annapurna Shaw (2005) covered the issues of governance, social capital and the role of local initiatives, in the context of maintenance and delivery of better environmental services to the residents of PUIs. Specifically, the first case is on the role of Shri Shankara Nagar Mahalir Mandram in Pammal, a town that lies within the 'Chennai-Metropolitan Area' and the second case is about Joka, a census town located in the south-western fringe of Kolkata metropolitan area. The secondary data on solid waste was analysed for both cities. Further, efforts taken by their respective administrative bodies (Village and Town Panchayats and Greater Chennai Municipal Corporation) were also studied. The author had found a positive development in solid waste management, and highlighted the potential of civil society organizations to scale up environmental management activities.

Two research projects that were undertaken by Hackenbroch and Woiwode at Indo-German Centre of Sustainability located in the Indian Institute of Technology (IIT-Madras) in 2014 and 2015, focused on "Climate change and socio-cultural transformation for sustainable living in urban India" and "Global visions and local realities of urban sustainable development: exploring strategic urban environmental politics and emerging spaces." After discussions with non-governmental organizations, government officials, research institutes, and civil society organizations, lobby groups, and individuals who are fond of sustainable urbanism, the authors stated that the citizen groups' activities in the sphere of environmental management were mediated by state institutions. Such people from citizen groups have been invited in local debates by the city authorities. The upcoming "Green aspirations" at the Chennai, have underscored the need to recognize the lifestyle at urban regions and the consumption choices of people living there, to sketch a holistic notion of sustainable development.

Seema Purushothaman et. al. (2016) reviewed 47 studies which worked on thematic, sectoral and conceptual discussions on PUIs. Most of the empirical studies on Indian PUIs do not imply a clear direction from rural to urban in any parameters, except talking about environmental externalities. Hence, the authors emphasized studies related to institutional and governance aspects of PUIs, and their significance to target social and ecological sustainability.

Mngumi (2020) conducted a study at three hamlets located near the Pugu forest reserve and the Kazimzumbwi forest reserve in the PUI of Dar es Salaam, Tanzania. The author had collected primary data through household survey and interviews, to assess social capital attributes. The results indicated that peri-urban communities at the study area, have relatively stronger social ties and a highly significant degree of connectivity among them. The strong social connectivity has been identified as a potential contributor in building 'Socio-Ecological System Resilience (SESR)', in the context of climate change.

Goldman (2011) brings into focus the structural transformation of rural economies into urban real estate economies. For instance, in the city of Bangalore in India, the nature of transformation has been the boom in 'Information Technology'. The Government of Karnataka and the Corporation of Bangalore's main economic activity was found to be land speculation, and rapid dispossession of those living and working in the rural periphery.

From this section, it is clear that a cohesive social capital among non-governmental and civil society organizations, government officials (governance) and local communities or citizens can mitigate the negative externalities and lead to greater positive outcomes that can happen through sustainable peri-urban growth. Though these positive outcomes are possible, two factors hinder such sustainable outcomes. They are the dominance of industrialization at PUIs, and vested interests of the elite minority.

PUI's Dynamics- Dominance of Industrialization and Vested Interests in Peri-Urban Growth

Among different processes of peri-urbanization, large-scale industrialization at PUIs have been the most dominant one in yielding negative externalities, in terms of environmental, social and economic dimensions. After recognizing evidences of 'Water Quality Decline (WQD)' at PUIs, Karpouzoglou et.al. (2017) stated that the above process has something to do with neo-liberalism which capitalized the states for reorganization of available spaces, which have relatively lesser value, primitive land use and that can pave way for modern capital-intensive developments that could induce capital. To check this argument's theoretical perspective, Karpouzoglou et. al. (2017) conducted a study at the trans-hindon region of the Ghaziabad city in Uttar Pradesh. It is located near the eastern border of Delhi. This study had conducted 30 semi-structured interviews with residents, bureaucrats, local activists and small shops. The authors had found that WQD was attributed to hazardous wastes disposal by the industries directly into the River Hindon. Such pollution of surface water had led to health hazards, as informed by the key informants and mainstream media. The authors concluded that in the urban planners' context, neglecting the social and environmental impacts of water pollution had been a usual exercise. So, WQD cannot be considered 'apolitical', rather it is sustained through politicized negotiations of urban and peri-urban elite people's vested interests. Such vested interests lead to negative environmental, health, social and economic impacts at an inclined level. The research studies conducted on Ennore, which is a highly industrialized PUI of the most urbanized metropolitan city in India, varied from pure scientific estimations to livelihood issues. For example, Chitrarasu et.al (2013) did a heavy metal analysis of sediment at the Ennore estuary. It was found that concentration of five heavy metals in the sediments of polluted water in the Ennore estuary were well above the permissible limits. Shanthi and Gajendran (2009) measured water pollution in the Ennore creek, and impact of the same on socioeconomic status of stakeholders. The study had found that there exists an extreme water-borne disease situation in the study area. Almost 41% of the sample households were found affected by cough and tuberculosis. In turn, it resulted in a loss of employment and income.

In its report, the National Institute of Ocean Technology (2004) published the results of a detailed study on water quality at Ennore creek. The flow of wastewater from North Chennai polluted the water and reduced its quality. Similarly, the data from 1994-95 to 2000-01 revealed that fisheries catch had been on the increase in Tamil Nadu but decreased in the study area. Balaji Balasubramanian (2018) conducted a study covering the representatives from users of port, inland fisherfolk community (four persons) and coastal community (two persons). With respect to public hearing, before the beginning of port expansion proposal, the respondents opined that they have not been clearly informed about the meeting's purpose. On the other hand, during public hearing, concerned authorities had explained only technical matters and not on loss of biodiversity and other environmental concerns. Further, the fishermen community had reported that before the degradation of mangroves and pollution from the industries, the estuary had been a productive nursery spot of different types of fishes and prawns. There are a few cases of loss of houses due to coastal erosion also reported. From the above studies, it is clear that the intensity of negative externalities is higher in case of peri-urban industrialization than that of other processes of peri-urbanization.

Conclusion

The review of literature on peri-urbanization and peri-urban industrialization was done by keeping in mind the broad area of "Peri-Urban Economy and its functioning." A brief note was prepared for each study and presented. The thrust areas covered by the studies reviewed include air quality, water quality (both surface and groundwater), landscape changes, social and economic conditions of the people displaced by the urban based development projects and its implementation, illegal industries, and construction activities apart from the so-called informal sector. Further, the sponsored studies and projects addressed macro-level issues and bereft off an ideological stand. For example, the peri-urban issues, at the surface level, give a look in the form of pollution, congestion, displacement, slums, unemployment, poverty and migration, and studies conducted on them also give populistic conclusions. Apart from the above, only a very few studies focused on local stakeholders like local communities, who have livelihood and health issues that are completely different from other categories of people.
The literature has highlighted the following,

1. The role of vested interests of urban elites and local landholders and local governments in the unplanned land use change, peri-urbanization and peri-urban industrialization processes
2. Violation of rights of local communities by the urban elites and local governments
3. Need for a planned peri-urban development
4. Interdependence among ecological, social and economic patterns
5. Role of NGOs and CSOs and public participation in achieving environmental sustainability
6. Strong social capital among for building resilience in environmental/ecological and societal systems
7. Inefficient role of governments in achieving environmental sustainability

Though the above issues and roles have been highlighted in the literature, majority (except a few) of the studies analysed the information and data in a general way without committing to a comprehensive analytical framework that incorporates environmental, social, economic and institutional dimensions altogether. In other words, the emerging as well as relevant comprehensive framework that analyses the land use change, environmental quality, (air, surface water and groundwater quality); nexus between environmental quality and health of local communities under the role and influence of efficacy of NGOs and CSOs, government and public/citizen's participation (based on their perceptions); impact of both land use change and environmental quality on livelihood and health (based on their perceptions); economic burden of illness; and ill-progress towards achieving sustainability and capabilities of resolving it, were not employed by the studies on peri-urban issues.
In this context, research studies need to thrive on all above in a sequentially way/as mentioned in the above comprehensive framework at the micro level, by focusing on environmental, institutional and socioeconomic aspects that pertain to the local communities.

References:

Abdulai, I. A., Enu-kwesi, F., & Agyenim, J. B. (2020). Peri-urbanisation: a blessing or scourge?. Journal of Planning and Land Management, 1(2), 12-22.

Adam, G. A. (2014). Peri-Urban Land Tenure in Ethiopia [Doctoral dissertation]. *Stockholm: KTH Royal Insti-tute of Technology. [Google Scholar]*.

Adell, G. (1999). Theories and models of the peri-urban interface: a changing conceptual landscape.

Aijaz Rumi (2022). Guiding peri-urban transformation, Observer Research Foundation, March, Urban From https://www.orfonline.org/expert-speak/guiding-peri-urban-transformation

Aijaz, R. U. M. I. (2019). India's peri-urban regions: the need for policy and the challenges of governance. *ORF Issue Brief*, *285*.

Anane, G. K. (2022). Continuity in transition: spatial transformation in peri-urbanisation in Kumasi. SN Social Sciences, 2(10), 224.

Appiah, D. O., Bugri, J. T., Forkuo, E. K., & Boateng, P. K. (2014). Determinants of peri urbanization and land use change patterns in peri-urban Ghana. Journal of Sustainable Development, 7(6), 95.

Balasubramanian, B. (2018). Challenges towards sustainable port development in India: The adverse effects of port development on coastal ecology and community in Ennore: a case study.

Bhanye, J. (2024). Beyond informality:'Nimble peri-urban land transactions'-how migrants on the margins trade, access and hold land for settlement. Discover Global Society, 2(1), 6.

Callejas Moncaleano, D. C., Pande, S., Haeffner, M., Rodríguez Sánchez, J. P., & Rietveld, L. (2024). Inefficiencies in water supply and perceptions of water use in peri-urban and rural water supply systems: case study in Cali and Restrepo, Colombia. *Frontiers in Water*, *6*, 1389648.

Cao, P., & Liu, Z. (2024). The impact of population characteristics on transportation CO2 emissions—does population aging important? Environmental Science and Pollution Research, 31(7), 10148-10167.

Chettry, V. (2022). Peri-urban area delineation and urban sprawl quantification in Thiruvananthapuram Urban Agglomeration, India, from 2001 to 2021 using geoinformatics. Applied Geomatics, 14(4), 639–652.

Chitrarasu, P., Ali, A. J., Babuthangadurai, T., & Manickam, N. (2013). Studies on the heavy metal analysis of sediment at Ennore Estuary in Southeast coast of India.

Coulibaly, B., & Li, S. (2020). Impact of agricultural land loss on rural livelihoods in peri-urban areas: Empirical evidence from Sebougou, Mali. *Land*, *9*(12), 470.

Damon, J., Marchal, H., & Stébé, J. M. (2016). Sociologists and the peri-urban: Its late discovery, changing definitions and central controversies. Revue française de sociologie (English Edition), 57(4), 418-436.

Davies, C., & Fourie, C. (2002). A land management approach for informal settlement in South Africa. 2002), Holding their Ground: Secure land tenure for the urban poor in developing countries, London: Earthscan, 218-230.

Durand-Lasserve, A., Fernandes, E., Payne, G., & Rakodi, C. (2007, May). Social and economic impacts of land titling programmes in urban and peri-urban areas: a review of the literature. In *world bank urban research symposium, Washington DC*.

Duranton, G., & Puga, D. (2013). The growth of cities.

Feola, G., Suzunaga, J., Soler, J., & Wilson, A. (2020). Peri-urban agriculture as quiet sustainability: Challenging the urban development discourse in Sogamoso, Colombia. Journal of Rural Studies, 80, 1-12. https://doi.org/10.1016/j.jrurstud.2020.04.032

Goldman, M. (2011). Speculative urbanism and the making of the next world city. *International journal of urban and regional research*, *35*(3), 555-581.

Gong, P., Liang, S., Carlton, E. J., Jiang, Q., Wu, J., Wang, L., & Remais, J. V. (2012). Urbanisation and health in China. The lancet, 379(9818), 843-852.

Goswami, M. (2018). *Conceptualizing peri-urban-rural landscape change for sustainable management* (No. 425).

Hackenbroch, K., & Woiwode, C. (2016). Narratives of sustainable Indian Urbanism: the logics of global and local knowledge mobilities in Chennai. South Asia Multidisciplinary Academic Journal, (14). https://doi.org/10.4000/samaj.4190

Haldar, S., Mandal, S., Bhattacharya, S., & Paul, S. (2023). Assessing and mapping spatial accessibility of peri-urban and rural neighborhood of Durgapur Municipal Corporation, India: A tool for transport planning. Case Studies on Transport Policy, 12, 100990.

Hapriyanto, A. R., & Azmi, H. (2025). Implementation of Green Infrastructure in Sustainable Transportation in Supporting Urban Mobility: A Literature Review. Engineering Proceedings, 84(1), 25.

Hoornweg, D., & Munro-Faure, P. (2008). Urban agriculture for sustainable poverty alleviation and food security. FAO. Africa.

Jovanovic, B., Rousseau, P. L., Aghion, P., & Durlauf, S. (2005). Handbook of Economic Growth. *General Purpose Technologies*.

Karpouzoglou, T., Marshall, F., & Mehta, L. (2018). Towards a peri-urban political ecology of water quality decline. *Land Use Policy*, *70*, 485-493.

Khanani, R. S., Adugbila, E. J., Martinez, J. A., & Pfeffer, K. (2021). The impact of road infrastructure development projects on local communities in peri-urban areas: the case of Kisumu, Kenya and Accra, Ghana. International journal of community well-being, 4(1), 33 53.

KOBZEVA, M., & KNICKEL, K. (2018). Interactions and dependencies between rural, peri urban and urban areas and contemporary governance approaches. Synthesis Report Rapid Appraisals–Deliverable, 2.

Kombe, W. J. (2005). Land use dynamics in peri-urban areas and their implications on the urban growth and form: the case of Dar es Salaam, Tanzania. *Habitat International*, *29*(1), 113-135.

Martínez-Jiménez, E. T., Le Gallo, J., Perez-Campuzano, E., & Aguilar Ibarra, A. (2022). The effects of land price in the peri-urban fringe of Mexico City: Environmental amenities for informal land parcel purchasers. Urban Studies, 59(1), 222-241.

McConville, J., & Wittgren, H. (2014). Peri-urban Sanitation and Water Service Provision Challenges and Opportunities for Developing Countries. Stockholm Environment Institute.

Mngumi, L. E. (2021). Exploring the contribution of social capital in building resilience for climate change effects in peri-urban areas, Dar es Salaam, Tanzania. *GeoJournal*, *86*(6), 2671-2689.

Mondal, D., & Banerjee, A. (2021). Exploring peri-urban dynamism in India: Evidence from Kolkata Metropolis. Journal of Urban Management, 10(4), 382-392.

Münzel, T., Hahad, O., Daiber, A., & Landrigan, P. J. (2023). Soil and water pollution and human health: what should cardiologists worry about?. Cardiovascular research, 119(2), 440 449.

Narain, V. (2009). Growing city, shrinking hinterland: land acquisition, transition and conflict in peri-urban Gurgaon, India. *Environment and Urbanization*, *21*(2), 501-512.

Nuhu, S. (2019, March). Peri-urban land governance in developing countries: understanding the role, interaction and power relation among actors in Tanzania. In *Urban Forum* (Vol. 30, No. 1, pp. 1-16). Dordrecht: Springer Netherlands.

Paramanik, R. C., & Paramanik, A. (2016). Unplanned Urbanisation and Environmental Degradation. Eph-International Journal of Biological & Pharmaceutical Science, 2(1), 17-22.

Purushothaman, S., Patil, S., & Lodha, S. (2016). Social and environmental transformation in the Indian peri-urban interface–emerging questions.

Rahaman, M. A., Kalam, A., & Al-Mamun, M. (2023). Unplanned urbanization and health risks of Dhaka City in Bangladesh: uncovering the associations between urban environment and public health. Frontiers in public health, 11, 1269362.

Rauws, W. S., & de Roo, G. (2011). Exploring transitions in the peri-urban area. Planning Theory & Practice, 12(2), 269-284.

Ribeiro, F. L. (2021). Unplanned urban development: a neglected global threat. Current Urban Studies, 9(3), 434-444.

Rodriguez, M., Bodini, A., Escobedo, F. J., & Clerici, N. (2021). Analyzing socio-ecological interactions through qualitative modeling: Forest conservation and implications for sustainability in the peri-urban bogota (Colombia). *Ecological Modelling*, *439*, 109344.

Saccò, M., Mammola, S., Altermatt, F., Alther, R., Bolpagni, R., Brancelj, A., ... & Reinecke, R. (2024). Groundwater is a hidden global keystone ecosystem. Global Change Biology, 30(1), e17066.

Saleem, A., Khan, A., Ghaffar, A., Kamboh, K., & Ali, I. (2014). Analysis of Housing Structure in Peri Urban Areas of Faisalabad, Pakistan. *Asian Journal of Multidisciplinary Studies*, *2*(1), 58.

Salvati, L., & Forino, G. (2014). A'laboratory'of landscape degradation: social and economic implications for sustainable development in peri–urban areas. *International Journal of Innovation and Sustainable Development*, *8*(3), 232-249.

Seifollahi-Aghmiuni, S., Kalantari, Z., Egidi, G., Gaburova, L., & Salvati, L. (2022). Urbanisation-driven land degradation and socioeconomic challenges in peri-urban areas: Insights from Southern Europe. Ambio, 51(6), 1446-1458.

Selod, H., & Shilpi, F. (2021). Rural-urban migration in developing countries: Lessons from literature. Regional Science and Urban Economics, 91, 103713.

Shaw, A. (2005). Peri-urban interface of Indian cities: growth, governance and local initiatives. Economic and https://www.jstor.org/stable/4416042 Political Weekly, 40(2), 129-136.

SHEHATA, S. M. (2018). The impact of green infrastructure rainwater harvesting on sustainable urbanism: Case study in Alexandria, Egypt. WIT Transactions on Ecology and the Environment, 217, 797-805.

Simon, D. (2008). Urban environments: issues on the peri-urban fringe. *Annual review of environment and resources*, *33*(1), 167-185.

Siyal, G. E. A., Khalid, I., & Qaisrani, A. (2018). Internal migration and urbanization: a case study from semi-arid regions of Pakistan. Sustainable Development Policy Institute.

Teston, A., Piccinini Scolaro, T., Kuntz Maykot, J., & Ghisi, E. (2022). Comprehensive environmental assessment of rainwater harvesting systems: a literature review. Water, 14(17), 2716

Toku, A., Amoah, S. T., N-yanbini, N. N., Sarfo, A. K., & Tornyeviadzi, P. (2024). Analysis of land-use and livelihood transformations in peri-urban areas: Insights from North-Western Ghana. Heliyon, 10(19).

Torres, H., Alves, H., & Aparecida De Oliveira, M. (2007). São Paulo peri-urban dynamics: some social causes and environmental consequences. Environment and Urbanization, 19(1), 207-223. https://doi.org/10.1177/0956247807076784

Tran, T. A. (2015). *The role of social capital and community ties in rebuilding livelihoods of displaced households in peri-urban areas of Ho Chi Minh City* (Doctoral dissertation, Iowa State University).

Wang, P., Zhang, R., Sun, S., Gao, M., Zheng, B., Zhang, D., ... & Zhang, H. (2023). Aggravated air pollution and health burden due to traffic congestion in urban China. Atmospheric chemistry and physics, 23(5), 2983-2996.

Waters, N. C. C. (2004). Waste load allocation & waste assimilative capacity studies for Ennore Creek & North Chennai Coastal Waters.

Webster, D., & Muller, L. (2009). Peri-urbanization: Zones of rural-urban transition. *Human settlement development*, *1*(1), 280-309.

Webster, D., Cai, J., Muller, L., & Luo, B. (2003). Emerging third stage peri-urbanization: Functional specialization in the Hangzhou peri-urban region. *Pacific Affairs*.