

Balancing Environment, Economy and Equity: planning initiatives in three cities in Brazil, Mongolia and India

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By 2050, 66 per cent of the world's population will be living in urban areas, with approximately 90 per cent of this increase occurring across Africa and Asia. While urbanisation is proving to be rewarding in terms of providing access to employment and infrastructure, its rapid pace is equally challenging to deal with as poverty, urban sprawl and environmental degradation are some outcomes of urban life that far outweigh the positives. Most often noticeable in developing countries is a trend of disproportionate distribution of population across urban areas, which in most cases has led to huge pressures on land, infrastructure, environment and economy(s) of cities. This paper seeks to examine the role of urban planning and the integration of current concerns of environment, economy and equity into master planning of three cities, on the basis that master plans can be more effective in enabling the sustainable growth of cities. The master plans of three cities – Sawai Madhopur in India, Curitiba in Brazil and Ulaanbaatar in Mongolia, are discussed in this paper with the intention of examining how these cities have dealt with rapid urbanisation and economic growth by employing master planning initiatives that seek to protect the environment, while allowing for sustainable growth in terms of the city's land use and its infrastructure.

Keywords: urban planning, sustainable urbanisation, environment, economy, equity

Introduction

Urbanisation has been increasing at a tremendous rate – in 2016, 54.5 per cent of the world's population lived in urban settlements, and by 2050 this number is expected to rise to 66 per cent. Approximately 90 per cent of urbanisation will occur in Africa and Asia up until 2050.¹ While urban areas provide greater opportunities in terms of education, health, social services, livelihood and employment, stress on existing city infrastructure along with disparities in access to public services and utilities, has resulted in fast growing urban areas often being marked by poverty, urban sprawl, pollution, and environmental degradation. This paper seeks to examine the role of urban planning in cities in developing countries, with a focus on the integration of current concerns of environment, economy and equity into master planning of cities, on the basis that master plans can be more effective in enabling the sustainable growth of cities.

Master planning or modernist urban planning as we know it today, has its origins in 19th century Western European planning and the values espoused by developed countries. Its spread through the rest of the world has occurred through “processes of colonialism, market expansion and intellectual exchange”, and through the influence of “professional bodies and international and development agencies”.² It is now widely acknowledged that the colonising imperative of ‘modernizing and civilizing’ was seen reflected in urban planning systems which sought to control urbanization processes and urbanizing populations. The legacy of modernist urban planning systems has persisted in many regions of the world, especially in developing countries like India where the “early 20th-century idea of master planning and land-use zoning, used together to promote modernist urban environments” continues to be employed.³ The result is a planning system which,

...fails to accommodate the way of life of the majority of inhabitants in rapidly growing, and largely poor and informal cities, and thus directly contributes to social and spatial marginalization or exclusion...fails to take into account the important challenges of 21st-century cities...fails to acknowledge the need to involve communities and other stakeholders in the planning and management of urban areas.⁴

In growing recognition of these issues there is a move towards urban planning initiatives which seek to make cities inclusive, safe, resilient and sustainable – this is also the basis of one of the goals of the *17 Sustainable Development Goals* (SDG) of the *2030 Agenda for Sustainable Development*.⁵ SDG 11 seeks to “enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries”.⁶ In fact, this is accentuated by the very idea of a sustainable city, as

achieving sustainability in an urban context requires balancing the often-competing demands of economy, environment and equity, such that “development, property and resource discourses” have equal and adequate representation in strategies that seek to make the city “more profitable, fairer and greener” for stakeholders, developers and administrators.⁷

The methodology adopted for this paper accordingly employs these three intersecting concerns of economy, environment and equity to examine the master plans of Curitiba in Brazil, Ulaanbaatar in Mongolia and Sawai Madhopur in India. These three lenses have been chosen as they broadly cover the challenges being faced by each of these cities – Ulaanbaatar’s nomadic heritage and environmentally sensitive natural environment; Sawai Madhopur’s historic city centre and environmentally sensitive natural reserve; and Curitiba’s highly applauded public transport system – each provide existing conditions of environment or equity that needs to be integrated with much needed economic growth and accompanying development. While the paper is limited in terms of a detailed examination of each of these cities, the aim is to present cases where master planning has been relatively successfully employed to provide guidelines for the development of a sustainable city.

Brazil’s ecological city – Curitiba

Curitiba recognised as one of the most sustainable cities in the world, is equally known for its master plan which has sought to integrate economy and environment into the development of the city as it faced unprecedented growth in its population in the late 1960s and early 1970s. With a current population of 1.8 million, Curitiba is Brazil’s eighth most populous city, and has a “higher per capita GDP and a lower unemployment rate than the Brazilian national average, as well as 55m² of green space per resident compared to the World Health Organization’s recommended area of 16m² per resident”.⁸ Its planning which is an economic strategy for the region has involved the following three aspects – identifying and building industry networks in the region and the country; investing in the city’s transportation; and establishing and building in the physical environment of the city and its surroundings.⁹ Four industries have been identified as being critical to the growth of Curitiba: the automotive – Curitiba being the second largest manufacturer in Brazil; communications software & information technology – second largest concentration of IT companies in Brazil; infrastructure – investments in transportation systems in and out of the city have enabled the growth of businesses in the region; and tourism – including business and leisure travellers.

Investment in the city’s transport has been one of the primary driving forces behind Curitiba’s planning – the attention to transport since 1934 saw the city’s roads being restructured into a radial system. This was subsequently replaced by a system of liner growth with the 1966 Master Plan that sought to streamline public transport and infrastructure, accompanied by appropriate zoning regulations. The objectives of the Master Plan included “strict controls on urban sprawl, a reduction of traffic in the downtown area, preservation of Curitiba’s historical sector, and building a convenient and affordable public transport system based on express buses”.¹⁰ This has resulted in a city which has limited growth in its historic centre, thereby ensuring its continued conservation, while having simultaneously encouraged commercial activities along five transport axes radiating out from the city centre.¹¹ Transport was therefore employed successfully to generate spatial growth. Critical to the provision of transportation was the idea of providing accessible and affordable public infrastructure, and this promoted the establishment of the Bus Rapid Transport system for the city and its surrounds.

Perhaps the most impressive aspect of Curitiba’s Master Plan has been the attention to sustainability and the environment since the 1970s – with early initiatives such as reservation of river and wooded areas, the city now has over 28 parks and wooded areas. The city has over 52sqm of green space per person as compared to 1970 when there was less than 1sqm per person. This has been made possible by the efforts of the city authorities and its residents who have played an equal and critical role in planting 1.5 million trees along streets and partaking in the creation of parks at neighbourhood levels – often from abandoned dumps and quarries.¹² Other environmentally sensitive initiatives have included the successful “garbage that’s not garbage” program that was started in 1980 to cater to the recycling needs of the city.¹³ An affordable alternative was floated by the government as it encouraged residents to sort their own garbage into organic and inorganic categories and has resulted in over 70% of the city’s trash being recycled by its residents.¹⁴ The establishment of the Free Open University for the Environment in 1991, which offers courses on environmental management and protection is another incentive developed to incentivise people to partake in the protection of their physical environment.

Ulaanbaatar: a smart city with Nomadic heritage

The Ulaanbaatar 2030 Master Plan for the capital city of Mongolia is a bold initiative that seeks to ensure the development of a city that is set in a unique geographical location with an equally unique nomadic heritage, and the need to meet demands of a globally competitive and technologically advanced world. The Master Plan for the

city has been prepared as a result of the increasing population which the Ulaanbaatar Capital Region – comprising of Ulaanbaatar city and a number of regional towns – has faced in recent years with migration from the surrounding provinces within the country. Currently standing at 1.38 million (2015) the population of the Ulaanbaata capital region is expected to grow to 1.76 million by 2030, forming 50.3% of the country's population.¹⁵ While the concentration of the population is largely within the boundaries of the city, the Master Plan aims to develop ten regional towns and three satellite cities within the Capital Region so as to encourage the establishment and growth of local industry and agriculture in the vicinity of the city, while ensuring that smaller settlements in the area are sustained.

Ulaanbaatar's history can be traced back to its establishment in 1639 as a nomadic Buddhist monastic centre. However, it has been the recent shift of Mongolia to a democracy and a market economy, from a formerly socialist nation, which has brought forth the need for sustainable development in the city and its surrounding areas. This transition that occurred in the 1990s, combined with a series of severe winters, resulted in large migration of many low-income families from the countryside into the city, causing issues of overcrowding, diseases, pollution of air, water, and other natural resources.¹⁶ This influx of Mongolians from other parts of the country into Ulaanbaatar continues as the city generates more than 60 percent of Mongolia's gross domestic product (GDP) and accounts for 50 percent of the total investment in the country.¹⁷ While urban planning has been in place in Mongolia since the 1950s when it was a socialist regime with Soviet-style urban planning, it has not been until 2000 – ten years after Mongolia democracy was established – that urban planning has been re-established in the county.¹⁸ The 2020 Master Plan precedes the existing one and was reworked on the basis that it lacked legislative backing in terms of implementation.

The 2030 Master Plan seeks to build on the existing city of Ulaanbaatar which was largely established between 1950s and 1980s under the Soviet-urban planning system.¹⁹ The city central area, residential blocks and districts in the inner-city areas, and apartment complexes in the areas surrounding the city, were established in the pre-democracy time period. This concentration of city central areas with centralized activities and services is being changed by the new Master Plan, as a multi-centric city model with decentralised government services, businesses and banking services is proposed to increase efficiency, reduce congestion and pollution. It includes a four-tier system of centres including two city centres, six sub-city centres, and neighbourhood based district centres and community centres. Land use zoning will also be introduced to plan and regulate new development in the city.²⁰ However, the most critical aspect of the 2030 Master Plan is that it recognises that Ulaanbaatar city and its surrounding areas cannot be considered as an independent development zone, but as part of a larger region in which surrounding regional towns and satellite cities are integrated and developed so as to alleviate population concentration in the city area.

Economic development of the Ulaanbaatar Capital Region is proposed with the aim of enabling the socio-economic growth of the surrounding ten regional towns and satellite cities, such that these areas are able to provide employment opportunities and livelihoods, thereby stemming migration to the city areas. It is proposed that each town and satellite city will have a particular focus of agriculture, or manufacturing, or logistical industry. Communications and utilities are planned to be developed in satellite cities together with the promotion of small and medium enterprises, thereby leading the development of satellite cities into integrated settlement clusters.²¹ Critical to the economic growth of this region and the county as a whole is transport infrastructure development, as Mongolia is a landlocked country, and this often results in comparatively high costs for consumers' products and transportation. Therefore, the regional development structure for Ulaanbaatar involves linking major urban activity centres to trunk roads such as the airport access, railway networks, and Asian Highway (AH)-3 connecting the country from the Chinese border to the Russian border.²²

Environment and its protection is of utmost importance to a formerly nomadic and still agrarian Mongolian culture. The Master Plan proposes that an Ulaanbaatar City green belt be introduced around the edges of the city. This green belt will include areas for agricultural uses, rural communities, summer camp areas, natural preservation areas, recreation and tourism activities, water resource protection and forest preservation, and existing restricted areas. While providing the city and its surrounds with public green space for tourism and recreation, the green belt will also function as an urban growth boundary for the city of Ulaanbaatar. In fact, land use of the city has been guided by strategies that seek to conserve the environmentally sensitive watershed forest areas and special protection areas; control development in areas unsuitable for urbanization, including steep lands and flood prone areas so as to mitigate disasters; conserve fertile lands suitable for agriculture; and maintain and improve existing biological networks of flora and fauna.²³

Sawai Madhopur: balancing equity, economy and environment

Located in the western Indian state of Rajasthan, Sawai Madhopur is a city of strategic importance for the state, given its triumvirate of national assets – a 9th Century UNESCO World Heritage site, a hill forest, and a national

park – all located within the city development region. With a current population of 133,165 which is expected to double to 234,563 by 2035, the city was identified as an ideal candidate for the preparation of a progressive, integrated master plan, that would inform the growth and development of the city for the next 20 years. Formulated in 2016 the draft Master Plan 2035 for Sawai Madhopur demonstrates the integration of concerns of environment, economy and equity into the master planning and implementation processes. To accommodate the future growth of the city, it has been proposed to increase the existing urban area of 1651 hectares to 5135 hectares so as to ensure that the city is planned for the future, and does not grow in an ad-hoc manner as is the situation with most cities in India.²⁴ Integral to the Sawai Madhopur Master Plan is the fact that the regulation of land use has been designed to conserve the assets of the city-region – heritage, forests, hills, water bodies, rural periphery – while at the same time accommodating changing economic energies and providing for the infrastructure needs of a diverse socio-economic population. Development regulations are detailed and tailored with specificity to the city’s environment notably the Ranthambore National Park, Forest hills, and Ranthambore Fort.

Tourism and agriculture as the mainstay livelihood providers, are recognised as the two key economic drivers in the Master Plan 2035. While 50 per cent of the expanded urban area is zoned for built-up urban use, the rest remains as an “urban agriculture zone” which is open, natural, and agricultural land.²⁵ This zone which along with cultivable land will encompass associated industries including food processing, cold storage, and an agricultural research institution, seeks to sustain and encourage an incentivised agricultural livelihood. Furthermore, its location within the reach of the city, will allow the urban agricultural zone to be an economically and ecologically viable model of agriculture. Environmental concerns are integral to the Master Plan 2035 with dedicated green spaces at the neighbourhood, sector and city levels. The amount of area dedicated for residential development in the Master Plan 2035 will be 36 per cent, as opposed to the existing 54 per cent. This lower gross density of the Master Plan 2035 is due to the increased allocation of recreational and green space of 22 sqm per person.²⁶

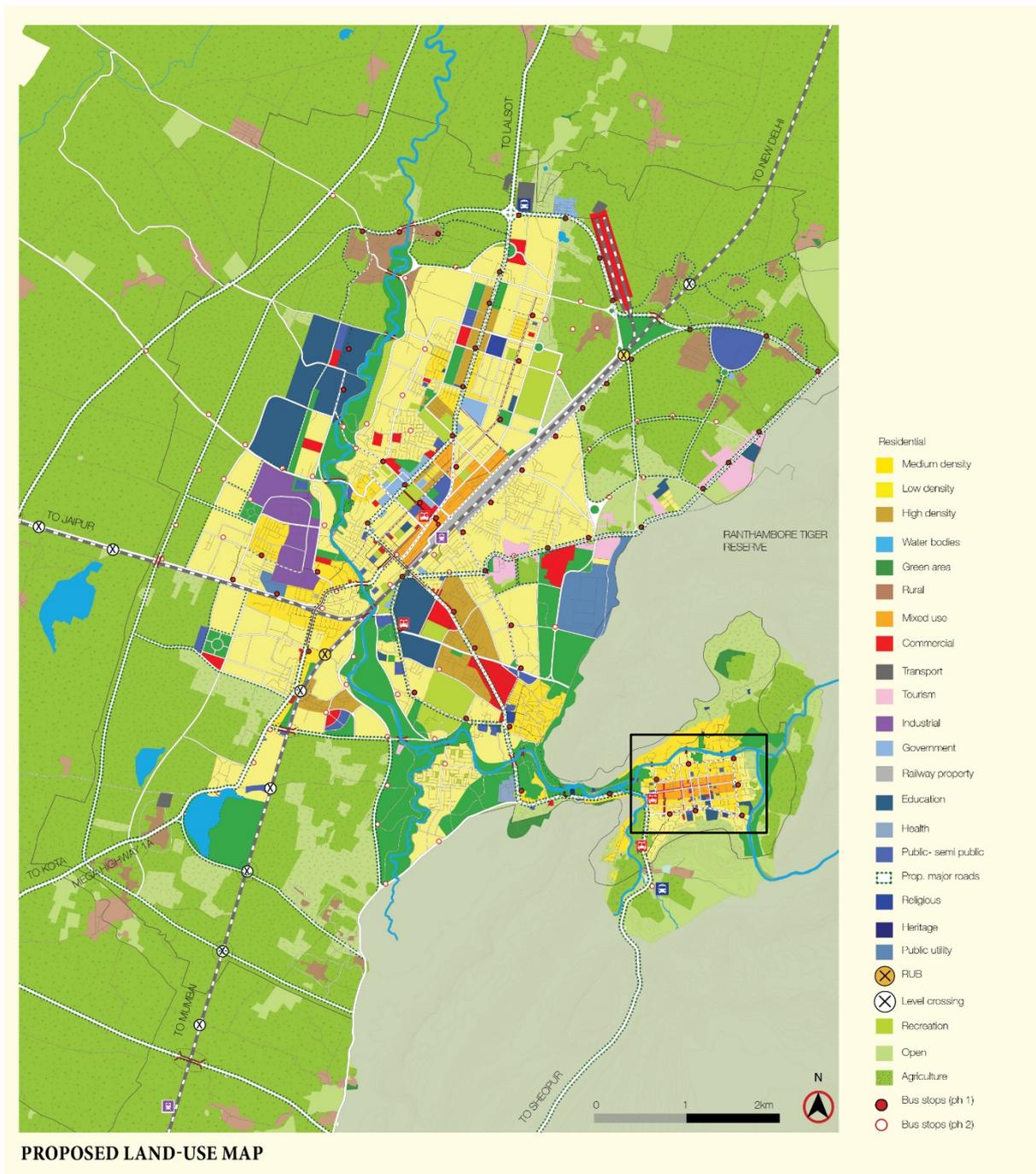


Figure 1: Jana Urban Space Foundation. *Proposed land-use map for Sawai Madhopur with the old city to the east (outlined by the box) surrounded by the Ranthambore National Park, and new development proposed to the north and west [Bangalore: 2016]*

The ecological imperatives of the agricultural zone are common with the heritage conservation measures identified in the Master Plan 2035. Ranthambore National Park, known for its large Bengal tiger populations, Ranthambore Fort as one of the Rajasthan Forts listed on the World Heritage List, and the Forest Hills form the context for the conservation initiatives for the city. Accordingly, a forest buffer of 1000 m has been zoned around the National Park, and a protective zoning for heritage is applied to 373 hectares of the urban area, which also includes The Old Town of Sawai Madhopur. A water infrastructure and landscape development project that involves the conservation, preservation and conservation of the 12.5 km long water body flowing through Sawai Madhopur is also proposed.²⁷ These conservation initiatives seek to safe-guard these ecological and heritage sensitive areas

from further development, and in doing so support the continuing growth of tourism industry in the city and its surrounds.



Figure 2: Jana Urban Space Foundation. *View of heritage listed Ranthambore Fort from inside the Ranthambore National Park* [Bangalore: 2016]

To enable the growth of economy in the area, connectivity is a primary concern that has been integrated into the Master Plan in terms of the development of a comprehensive network of roads in neighbourhoods, the city, and the surrounding rural region. A few key proposals to improve mobility, and therefore economic vitality in the city and its region, include developing a planned hierarchy of new roads, buildings roads to increase connectivity to surrounding rural settlements, provision of transport and trucking facilities at key locations, and provision of bus shelters, bridges, pedestrian pathways and parking lots. Public development projects such as civic and social infrastructure projects including a sports arena, a convention centres, a farmer’s market, a city park and festival celebration ground are also included in the Master Plan to support the local economy of the city. Other economically driven measures include redevelopment, specifically infill urban development within the existing city area of 1651 hectares, of which only 882 hectares are built up. The remaining 567 hectares are zoned for infill development so as to allow for greater density and use within the city.²⁸

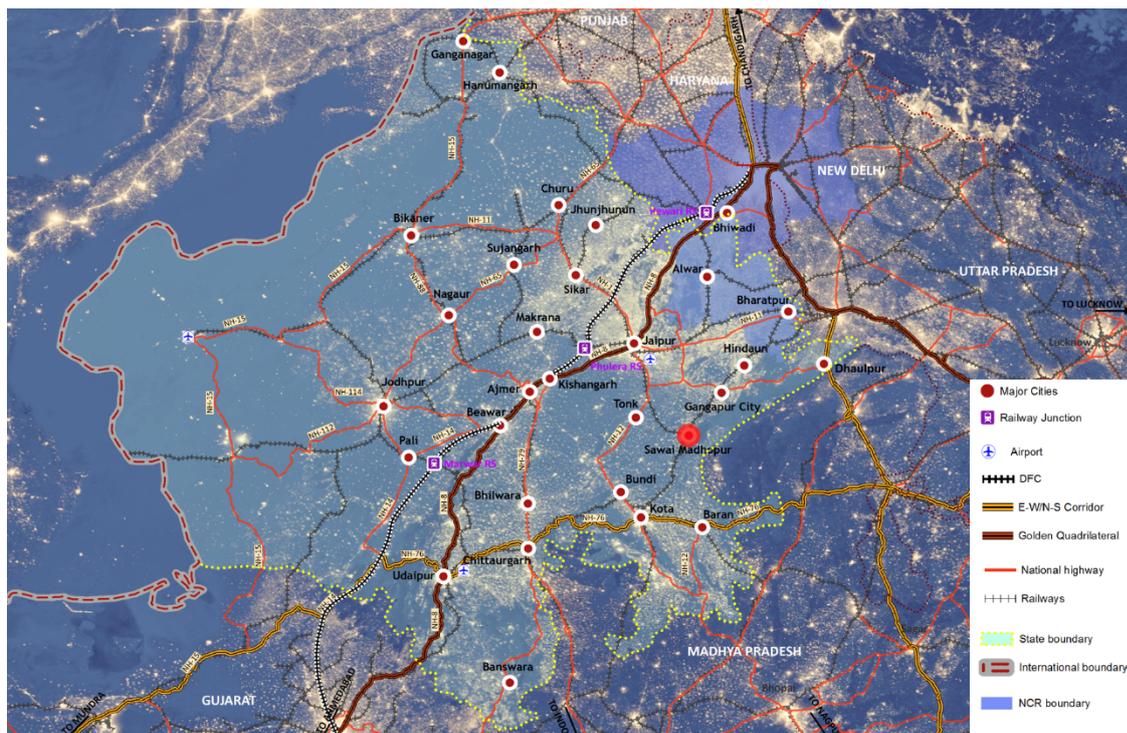


Figure 3: Jana Urban Space Foundation. *Map of Sawai Madhopur showing its location in the western Indian state of Rajasthan, and the larger regional context of the city in terms of connectivity* [Bangalore: 2016]

Central to the infill development zoning is the idea of spatial equity – the Master Plan 2035 introduces mixed income zoning, with affordability in housing for all socio income groups. Plotted and flatted residential land of varying sizes, with access to civic infrastructure and social amenities have been delineated in the Master Plan. The need for affordable housing in the city can be evidenced in terms of the number of slums in the city accounting to 45.²⁹ A total of 974 hectares of land have been reserved for residential zoning with nine categories of housing types proposed so as to cater to the housing needs of different economic groups. The idea of equity has also informed the new classification of road networks, in recognition of the hierarchy prevalent in high density lower income housing developments. For such developments, road widths have been set at between 5m to 1m, and have been classified as lanes – primary access, secondary access, and pedestrian access lanes.³⁰ It is also proposed that infrastructure networks be designed for such lanes, and zoning regulations be customized appropriately.

Other infrastructure projects proposed include water, sewage, drainage, power, and health facilities. The Master Plan 2035 encourages a “zero waste” city through the development of a comprehensive sewage and drainage network plan which will include large and smaller sewage treatment plants, and a proposed landfill site, which it is hoped will help arrest the current ad-hoc, ill-managed and polluting waste disposal processes currently in place in the city. Water supply and coverage for the Sawai Madhopur region is expected to increase from 72 per cent to 100 per cent, as a result of a state developed urban infrastructure project, and the construction of overhead water tanks and new household water connections. To counter the existing condition of 66 per cent of sewage flow into open storm water drains, a new sewage network that delivers sewage from the primary source to the sewage treatment plant is planned for the area. 35 per cent of Sawai Madhopur homes do not have toilets and the Master Plan 2035 necessitates a 100 per cent coverage. Digital connectivity is emphasised for the city to support the growth of industry and enterprise in the city and its region.³¹

Conclusion

This paper has sought to demonstrate that the modernist approach to master planning has undergone considerable changes notably in developing countries where cities are faced with rapid urbanisation, and concerns of poverty, urban sprawl, pollution, and environmental degradation. Moving towards the larger global agenda of creating cities that are sustainable, resilient, inclusive and safe, urban planning in cities like Curitiba, Ulaanbaatar, and Sawai Madhopur seeks to balance the intersecting yet competing demands of economy, environment and equity. While the master plans for Ulaanbaatar and Sawai Madhopur are very recent initiatives a few issues and concerns have emerged pertaining to the overall long-term targets of these master plans. This can be evidenced in the case of Ulaanbaatar as the master plan is seen as catering to the larger urban context but failing to address the housing shortage faced in the city, and its impacts on the surrounding traditional nomadic areas. The master plan of Curitiba best known for its transport system, is facing challenges in terms of continuing to provide affordable transport, as the city grows out towards new suburbs which are largely occupied by the urban poor. While the effectiveness of these master plans cannot be ascertained as yet, the fact that these are regionally, economically and environmentally sensitive responses to each city’s own unique set of urban circumstances, is a step in the direction of a sustainable city.

Disclosure Statement

No potential conflict of interest was reported by the author.

Notes on contributor(s)

Swati Ramanathan is co-founder of Jana Group, a clutch of social enterprises in India, committed to deepening democratic engagement, urban transformation, and financial inclusion. Ms Ramanathan was honored by the Government of Rajasthan for her work on the Jaipur 2025 Master plan, and Guaranteed Land Title Certification. She has been named a Young Asian Leader by the Asia Society, and honoured by the National Democratic Institute in Washington DC, with the Democracy and Civic Innovator Award. She and her husband have been honored with the Social Entrepreneurs Award by Forbes India. Ms Ramanathan holds a BS from India, and an MS from Pratt Institute for Planning Architecture and Design, N.Y.

Vidhu Gandhi is an architect, heritage consultant and researcher with experience in heritage conservation, architecture and urban planning in Australia and in India. She has worked with heritage conservation and architectural practices in Sydney and Adelaide in the role of heritage consultant and advisor. In India, she worked with Jana Urban Space Foundation as Team Lead for Planning Policy. Subsequently she joined Srishti Institute of Art, Design and Technology, as Dean of Postgraduate Studies, Head of Liberal Studies, and coordinator of the

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