



City and Environment
in a Globalised World



55 years after the 1955 Bandung Asian-African Conference and 20 years after the end of the Cold War, in the context of Globalisation, the world is still characterised by wars, domination by the powerful, exploitation of the weak. In addition, Globalisation has posed two challenges for the sustainability of our planet: the degradation of Environment and the growth of Cities. People cannot escape from these two global challenges, but face them in their own localities. The actors for a sustainable future are therefore supposed to answer the "Global Challenges" with "Local Responses".

The responses from Africa and Asia deserve special attention. On the one hand, despite the continuous process of globalisation following the expansion of capitalism, colonialism and imperialism started from Europe, Africa and Asia have not been uprooted by Western Civilisation and are therefore thought to be the source and pool of bio- and cultural diversity needed for the sustainability of our planet.

On the other hand, Africa and Asia are particularly affected by the degradation of Environment and the growth of Cities. The planet is in the midst of a 6th great extinction of life forms faster than the previous ones and the climate change largely provoked by the "developed North" will be especially harmful to the "developing South". As for Cification, the urban population worldwide grew over 10-fold during the 20th century alone, and UN has projected in 2012 that "Africa and Asia together will account for 86 per cent of all growth in the world's urban population over the next four decades."

So, what are the "Local Responses" from Africa and Asia to these "Global Challenges"?

29 authors from 16 countries of Africa, Asia, America and Europe try to answer the question.

Albinus Mkota Pastory Makalle (Tanzania)
Benny Teh Cheng Guan, Ibrahim Abu Bakar (Malaysia)
Carina America, Martina Jordaan (South Africa)
Darwis Khudori (Indonesia/France)
Deden Rukmana (Indonesia/USA)
Dokun Oyeshola, Favour Temitope Jiboye, Martin Uadiale, Meshach Ofuafor, Rasheed Olaniyi, Toju Ogbe (Nigeria)
Eka Swadiansa, Invani Lela Herliana, M. Faishal Aminuddin (Indonesia)
Eric O. Okuku, James G. Kairo, Judith A. Okello (Kenya)
John Walsh (UK/Thailand)
Kaarina Kailo (Finland)
Kong Linghong, Zhu Rong (China)
Nguyen Dac Nhu-Mai (Vietnam)
Oscar Gakuo Mwangi (Lesotho)
Roland Lin Chih-Hung (Taiwan/France)
Sagarika Suri, Swati Janu (India)
Yukio Kamino (Japan)

UB Press

Veteran St. Malang 65145 Indonesia
Phone : +62-341-551611 - Ex. 376
Fax : +62-341-565420
E-mail : ubpress@ub.ac.id
ubpress@gmail.com
Web : www.ubpress.ub.ac.id

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TOWARDS
A SUSTAINABLE
ECOLOGY

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55 Years after The Bandung Asian-African Conference 1955

Global Challenges and Local Responses in Africa and Asia

Editors : Darwis Khudori and Yukio Kamino



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The River and the City
2012

Changing conceptions of the Yamuna in contemporary Delhi

- Sagarika Suri, Swati Janu

Abstract: The paper takes a look at how the river Yamuna, passing through the Indian capital city, has dictated the urban patterns of the historic cities of Delhi and still continues to define and reflect the contemporary city's development and aspirations. From engendering the very pattern of urbanism in Delhi during the Sultanate¹ period, to being relegated to a peripheral entity in the capital of the new independent nation, the river and the hydrological systems associated with it have been variously located within the psyche of the city. A look at the history of the river and its tributaries offers a glimpse into the history, values and urban forms of the various cities of Delhi.² By tracing the processes that defined the relationship between the river and the city over time, the paper aims to understand how the river, in today's developing city, is emerging as a bastion for a myriad of agendas. With the river being pitched as a metaphor for urban renewal, it is now being re-centered into the physical, social and political imagination of the city. The paper argues that the physical, psychical and symbolic extent of the river affords an opportunity where the revival of interest for the renewal of the river has the potential to become a renewal of the city.

Sagarika Suri, B.Arch., Centre for Environmental Planning and Technology, Ahmedabad and M.S. (Architecture and Urbanism), Massachusetts Institute of Technology, is an architect and urban designer. Swati Janu, a graduate from the School of Architecture and Planning, New Delhi is an architect and writer who has concerned herself with urban issues, particularly around the city of Delhi.

1. Introduction- River as the Microcosm of the City

The Yamuna has been the location where many of Delhi's stories have unfolded. It has been a part of the city's numerous narratives of mythical beginnings, transportation and drainage infrastructure, public space, funerary rites, and urban development and decay. It has been variously polluted, crossed, contested, venerated, ignored, even converted into a botanical garden and pitched as a major infrastructure project for the developing city.

While the establishment of an elaborate canal and damming system linked to the Yamuna informed the very process of urbanization in the city during the Sultanate period, the British treated the river as an edge, building over the streams to create roads for the new imperial capital. In the post independence period too, the river provided an ideal location for its urban projects as well as a refuge for squatter settlements. Despite its gradual relegation to a city level drain, the river has continued to have an important physical and psychological influence within the contemporary city and in the 21st century, the river is being propagated as a desirable backdrop associated with the city's development and progress. Wealth, political clout, social and ecological activism have all found a legitimate claim on the river in present times.

The paper will elucidate how the river has been appropriated, symbolically and physically, particularly in the context of the contemporary city, by its various stake holders. It will present the river within its contemporary urban context where it manifests the dichotomy between the aspirations of the city beautiful and contending the evictions of urban poor from its banks; and how the growing real estate value of the river, in the race for the coveted world class city status, is vying with concerns raised by environmentalists and conservationists.

The paper contends that the identity of the river with respect to the city, as a defining geophysical feature and as a socio-political symbol, provides a microcosmic view of the forces that have and continue to play themselves out in the formation of the city. It finally aims to understand the various contemporary notions of the Yamuna as Delhi strives towards the coveted world class city status and how the current re-centering of the river in the metropolitan imagination can become an opportunity for the concomitant renewal of the river and the city.

2. Mapping the River- a brief Geophysical Description of the City and its Hydrology

Delhi is a triangle defined by the Ridge on its western edge and Yamuna on the east, which formed the natural boundaries and provided security for its erstwhile settlements. It is this favorable terrain that the Sultanates used, developing their cities around the hydrological system of perennial and seasonal storm water drains that flowed from the highlands of the ridge and drained west-east into the river. Today, most of these streams have been buried, built over and across or become sewage drains dumping Delhi's waste into the river.³

Entering the city at *Palla* village, the 22km stretch of the river between *Wazirabad Barrage* and *Badarpur Barrage*, today, accounts for 80% of its pollution load. While constituting barely 2% of its catchment area, Delhi is the single largest polluter of the Yamuna, with 22 sewage drains

emptying domestic waste into the river.⁴ In light of this contrast in the river's usage and treatment over time; it becomes pertinent to trace the river over the last thousand years of urbanization along it in order to understand the urban processes and plans, leading up to its gradual decline and present state of decay.

3. Tracing the River- the River's Relationship with the Historic Cities of Delhi

The River and the Ridge, it was these two geographical features that made the Delhi plains a favorable location for its first historic cities. These settlements were always located on a highland for security and drainage, given the region's rich subterranean hydrology. Standing atop the *Lal Kot*⁵ wall in the middle of *Sanjay Van*⁶, one is offered a brief respite from the chaos that marks the city today and can begin to imagine the outline of what is largely considered the first city of Delhi.⁷ Built by the *Rajput* kings, the city made use of the catchment areas of the hilly terrain of the Ridge to build the water tank *AnangTal*, 10 km from *SurajKund*⁸, later expanding the kingdom four times its size, to *Qila Rai Pithora*. However, it was in the *Sultanate* era that hydrological engineering was pioneered, as a sustainable model of urbanism.

Psychological Location of the River in the Sultanate Period

During the *Sultanate* period, the establishment of an elaborate canal and damming system linked to the Yamuna was central to the process of urbanization, ecology and governance in the city. Understanding the terrain of the land and harvesting rainwater during the brief monsoon season, the *Tughlaqs*⁹ designed waterworks not only for economic and military reasons, but also as an informed ideology.

A system of water based structures, namely lakes and dams, can be traced in the form of a network that made use of the surface runoff from the Ridge to create interconnected catchment areas. Three concentric arcs of water channels, created and controlled by embankments along the contours of the Central and South Central Ridge, collected its waters eventually draining into the river.¹⁰ A hierarchical network of *bandh-hauz-qasr-bagh-shahr*, Hindi for dam-lake-fortified village-orchard-city, was gradually set up along which the *Sultanate* settlements thrived for over two centuries.

The damming of a run-off stream from the Ridge created a lake, providing an assured source of water which in turn led to the formation of village settlements around it. The embankments occurred at every two miles with only remnants of these structures today, with many of them completely destroyed or constructed on. By acting as bridges and walls, the dams allowed for easy continuous movement of troops along the Ridge, providing them with vantage points over the plains. These were further fortified to take up the additional role of defense as well as postal nodes. As the *Sultanate* grew, the water systems were developed and formalized, such as the *Satpula*¹¹ dam, which also formed a part of the south-eastern wall of the city of *Jahanpanah*¹². Eventually the villages came to be recognized as distinct revenue and defense units.

The system of canals allowed for irrigation of fields on the outskirts of the city. These fields were often converted into orchards and retreats for the royalty, incorporating gardens into the system. Because the extent of the dam network allowed for a larger radius of suburbs, there was a greater integration of the suburbs with the city. In addition, the aristocracy set up fortified palaces along the network, located away from the main settlement for security from rebellious populations. The fortified palaces in turn stimulated new urban developments around them; in this way the presence of the canal and dam network allowed for the ‘multiple cities’ phenomenon, which has continued to define Delhi.

The River as Landscape during the Mughal Era

It was from the 16th century, that the Riverfront came to be preferred to the Ridge for urbanization, with the coming of the Mughals¹³. The tomb, palace and garden architecture of the Mughals responded to the river’s presence, which used it as a backdrop for aesthetic pleasure and framing views. Separation marked the interface with the river in the form of high walls with enclosed royal gardens creating private enclaves. This not only provided safe refuge from the floods, but also offered social separation with a “riverfront whose dominant visual order spoke of splendor and politically motivated spectacle”¹⁴. The riverfront was considered an imperial landscape, with access and views monopolized by the elite, as well as a transportation artery.

The walled city of *Shahjahanabad*, today known as Old Delhi, was situated along the western bank of the river Yamuna by the fifth Mughal Emperor *Shah Jahan*. The Mughals developed a sophisticated water system for garden architecture and masonry bridges such as the *Barahpullah* and *Athpullah*, which still exist to date.¹⁵ In the city’s relationship with the river, is important to note that the water from the adjacent river was used to fill only the moats around the walled city and the Red Fort, but not in the canals and lakes inside.¹⁶ For this, water was transported through the West Yamuna Canal over 120 kilometers carrying water from the river upstream at *Hansi*, in the state of *Haryana*. First constructed by Sultan Firoz Shah during the 14th century, Akbar took up the renovation of this canal for irrigation and to feed the inner canals of the walled city.¹⁷ This regional canal entered the city at *Kabul Gate* and ran east-west towards the fort, the fort’s inner channels running perpendicular i.e. north-south, though aligned parallel to the river¹⁸

Colonial Period- Segregation and Manifestation of Empire

While the Mughals capitalized on the riverfront for its views and as a cultural landscape, the British colonizers treated the river simply as an edge to the city of New Delhi, for draining off sewage. In September 2010, remains of an elaborate underground double barrel sewage network from the British era were unearthed by NDMC (New Delhi Municipal Council) when it started digging for the construction of subways at *Connaught Place*.¹⁹

For the British, New Delhi was a showcase city for the empire.²⁰ The Capital was shifted from Calcutta to Delhi with much aplomb in 1911. Laid out southwest of *Shahjahanabad*, New Delhi was designed to inspire awe, to manifest segregation and supremacy. The site, today known as

Lutyens' Delhi after its planner-architect, was a flat area defined by the Delhi ridge towards the east and the *Nizamuddin* rivulet towards the west. The layout of the ancient rivulets was reinterpreted as circulation routes, with new roads built over the existing streams, burying them.²¹

The British used the course of streams and the layout of landscape as a means of establishing segregation between the colonizers and class based neighborhoods. Streams were diverted, for instance, those originating from Indian Clerks' Housing at *Gole Market*²² and flowing southwards towards Windsor Place and Princes' Park, to sever physical and visual connectivity²³. The city greens were laid out at the periphery of the old city, to create a barrier from the indigenous dense settlement. The creation of New Delhi was simultaneously the creation of a large insulated community, with this imperial physical form continuing as an elite enclave even today.

With a European approach to planning, borne as a response to the environmental and social effects of Industrial Revolution, 'colonial urbanism' was rooted in conceptions of sanitization and public health and looked down on informal and local urban practices²⁴. The British took up the construction of water supply lines for their new capital city with an underground sewage network that ultimately drained into the river. Thus, began the use of the Yamuna as a drain, which set the tone for Independent India as well, continuing the river's gradual relegation up to its eventual and complete decline today. While the media has been raving over hundred years of Delhi as the capital²⁵, it might help to remember that it is only in this last century that the city has managed to misuse its river as a drain in all of its thousand years of urbanization along it.

Post-Independence- Partition Frenzy and Continuing Segregation

Independence, and the Partition²⁶ that accompanied it, saw an unprecedented exodus between India and Pakistan amidst violence and frenzy. The capital of the newly independent nation witnessed a tremendous increase in population, without the means to cope for it. Refugee colonies were first laid out along the low lying east banks of the Yamuna, a continuation of the notion of the river as an edge to the city from the colonial period. Along the lines of what the British had started when, for the first time in Delhi's history they 'resettled natives' in the Old Shahadra area on the east banks of the river,²⁷ the river was treated as a periphery to keep away the 'unruly, unwanted' populations despite land being available south of the city.²⁸ As more and more refugees poured into the city the settlements were later extended to sites towards the south and west of the city, to form the present South Delhi colonies²⁹ such as *Lajpat Nagar* and *Malviya Nagar*, and *Karol Bagh*, *Rajendra Nagar*, *Tilak Nagar*, *Patel Nagar* in the west.

The use of the river for socio-economic segregation can be seen as a continuation of the colonial approach. Even the naming of the new government colonies set up around the same time, such as *Sewa Nagar*, *Vinay Nagar*, *Maan Nagar* and *Shaan Nagar*,³⁰ was a reflection of the civil service hierarchy based on status and income- a legacy left behind by the British.³¹ The two most

prominent geographical features of Delhi, the River and the Ridge further played an important part in the pattern of residential segregation, with the relegation of refugee and socio-economically weaker colonies to the east and west of the city; while the rich and affluent continued to settle southwards- these segregated residential zones dictating real estate prices and social perceptions till today.³²

Gradually the river's edge came to acquire a new significance. As the city grew on either side, the river no longer remained physically peripheral. However, it continued as a backyard to the city, akin to a sewer, that the urban poor came to occupy.

The Emergency and the Unequal Dynamics of Encroachment and Evictions

The original inhabitants of the river were the river bed cultivators who had occupied the banks for many generations, connected to a centuries old ridge-river-agro tradition.³³ These peasant communities held leasehold rights to the riverbed, which were recognized by the government after independence. The first Delhi Master Plan, drafted in 1962, designated the edge as floodable which meant that except for a few recreational parks on the western side, the embankments were to be left devoid of development. At the same time, it is this very same Master Plan that allowed for setting up of thermal power plants and an electric crematorium on the west bank of the river, continuing the city's treatment of the river as an edge.³⁴ Today, three thermal power plants are situated along or near the river, together dumping 60,000³⁵ tons of fly ash daily into fly ash ponds which inevitably finds its way into the city drain, namely the Yamuna. While the original inhabitants of the river bed have been long evicted in the name of encroachment, it is these power plants that have been the largest encroachers on the ecology of the city, for over fifty years and still continue to do so.

With the large scale refugee influx followed by immigration from the neighboring states in a city whose master planning fell grossly short of its requirements, unplanned settlements sprung up with this 'unorganized' sector constituting nearly half of the city today. In the name of 'City Beautification', which was initially started by the British in 1936³⁶, and continues to define the city authorities' approach to cleanliness and development;³⁷ it is this informal city that has always borne the brunt of eviction and displacement while large scale state sponsored encroachments or those by the rich, have been overlooked.³⁸ The process of reclaiming the river bed translated into evictions which started as early as 1967³⁹. During the national emergency in 1975, amid much chaos and political upheaval, almost 700,000 people from various 'slum' colonies were evicted and relocated to make way for city beautification projects. Most of the evicted were resettled across the city along the river's east bank. Yet again the river became a barrier between the city and its undesirable elements.

With the 1990s, came Post-Liberalization and Globalization, the city being keen on achieving its 'World Class' status. In the March of 2004, *Yamuna Pushta*- a settlement of over 150,000 dwellers on the banks of the Yamuna was bulldozed to rubble. The unauthorized colony, until

then considered the largest and oldest ‘slum’ of Delhi, was simply *swept off the map*⁴⁰ to make way for a 220 acre riverside promenade as a part of the beautification drive for the Commonwealth Games. Today there is no sign of such a green belt and the same plot of land is being used by MCD to dump garbage illicitly.⁴¹ Equally shocking is the story of the river itself, which is now the most polluted river in the country- with more than half the city’s sewage flowing into it without adequate treatment.

The Games as Mega Events in Urban Development-1982 to 2011

“Mega-Events are premeditated spurts of concentrated urban activity”⁴². Mega Events such as International Games are increasingly being looked upon as opportunities for urban regeneration and transformation. As in the case of Barcelona Olympics 1992, large scale urban development with long term changes has been brought about by using such events as catalysts for change.⁴³ However, an attempt to create a ‘showcase’ city that focuses on the ‘spectacle’ of the Games event itself, looking at short term economic returns, can bring about ecological and social deterioration, as has been the case with Delhi.

The *Asian Games* in 1982 were seen as an opportunity to spruce up the infrastructure of the city and many exceptions to the 1962 Master Plan were made to achieve this. The *Asian Games* development was sited along the river bank because of lack of space elsewhere in the city- a move that started to change the status of the neglected river, integrating it into the development plans of the city. Billions of rupees were spent on the construction of ‘world class’ stadia, with Jawaharlal Nehru Stadium being the centre-piece, *Indira Gandhi Stadium*⁴⁴ and *Yamuna Velodrome* constructed on the west banks of the river, and *Talkatora Stadium* in the Ridge area. A part of the *Siri Fort Forest* was cleared for the *Asiad Games Village*, designed by the reputed architect Raj Rewal, and the city saw the construction of new hotels, roads and flyovers. These developments along the floodplains of the river and on the protected greens of the city, were in gross violation of the Master Plan, but escaped criticism in the name of ‘national prestige’ and patriotism.⁴⁵

This trend of unsustainable urban development at the cost of its ecology only continued with the *Commonwealth Games* held in 2010, which is now being looked at as a *showcase of missed opportunities*. The sprawling 100 acre⁴⁶ temple complex *Akshardham*, whose construction was allowed on the eastern floodplains of the river in the name of religion, and opened to public in 2005, paved way for further development on the banks. The multi storied luxury apartments, deceptively touted as a Games ‘Village’⁴⁷ were next to come up, covering an area of over 150 acres. Mired in controversy and sealed after the Games for having violated FAR [Floor Area Ratio] norms, these apartments now remain vacant.

Apart from a lot of embarrassment over allegations of scams and corruption,⁴⁸ the Games have also left behind in their wake- a 4km long stretch of elevated road on the *Barahpullah Nallah*⁴⁹ and parking for 300 DTC [Delhi Transport Corporation] buses on the floodplains which was

initially allowed in the name of temporary parking for the duration of the event. The other biggest player in the concretization of the riverbed has been the DMRC [Delhi Metro Rail Corporation], with the *Yamuna Bank* Metro Station and Depot, *Shastri Park* Metro Station and Depot and the *Akshardham* Metro Station built on the river's eastern floodplains. The two new metro lines crossing the river now give the people a brief glimpse of their river which has now become a mega drain for the city and also its hottest piece of real estate. With billions of rupees spent on the alleged cleaning of the river through various plans such as the Indo-Japanese bilateral Yamuna Action Plans I and II, and a likely phase III, the city has nothing to show for it.

4. Re-Centering the River

A cross section through the river at a given time in history provides a microcosmic view of the city; the decisions, dialogues and conflicts related to it accurately represent the nature and condition of the city and vice versa. While the utilitarian and aesthetic significance of the river is easily identifiable in the Sultanate and Mughal periods, the capital city of the newly independent nation, trying to cope with many unprecedented issues and events, was unable to perceive or develop the public importance of the river, relegating to it functions that were undesirable within the city. The river lost out on its due aesthetic, recreational and symbolic importance, and the denizens lost out on access to the river.

Currently the river is being re-centered within the metropolitan imagination and exerts a renewed physical and psychological influence on the contemporary city. On one hand, the paucity of physical space in the city affords new real estate and infrastructural importance to the river and the hydrological systems associated with it, which represent large tracts of open space in the heart of the city. On the other, the river as a visible, historic and neglected feature which meanders through the length of the city provides an appropriate symbol and space for many types of urban agendas, from the environmentalist concerned with ecology, the political entity propagating the idea of beatification as manifesto, the social activist bringing to light the lopsided development in the liberal city. The attention to the river and the coming to light of these various agendas in turn signal a maturing of the civic classes and the development of divergent views through exposure, education and experience, through which the city heralds its world class status, transcending from a nascent urban entity to a more complex one.

Despite the phenomenon of the *developing city and the physically shrinking river*, reduced to a drain in many places, the symbol or idea of the river continues to expand in the contemporary narratives of the city and the current re-centering poses opportunities for both the city and the river.

5. Epilogue- Re-imagining the River

In describing the rejuvenation of the LA River, Robert Gottlieb argues that the rejuvenation of the river is intrinsically linked to social change in the city and that solving the problem of the

river would be symbolically akin to solving the problem of the city.⁵⁰ The project of the river has the ability to be many things at once, from infrastructure, memento, and public space to a social equalizer, much like the recently completed Delhi Metro Rail project which has come to represent a democratic piece of city infrastructure. Like the Metro, the river too has a meandering presence, passing through disparate parts and enabling access to it could create another egalitarian project for the city.

Governments have a proclivity of framing issues as techno-managerial⁵¹ rather than aesthetic or socio-cultural. As a result, the scope and focus of development supersedes the community scale and becomes more solution and infrastructure oriented; issues of traffic flows, parking, and sewage treatment sidelining community scale interventions linked to livelihoods, recreation or public art. The floated and much debated plan to channelize it, based on the Thames model,⁵² further elucidates the myopic vision, of reducing it to a concrete channel in the absence of an inspiring vision. Not only is it a means of giving over its banks for commercial urbanization which is criminally destructive to its bio-ecological system, but it also fails to recognize the potential of the project wherein the river has to be viewed as a networked public space, a city scale connector.

Social programs related to livelihoods, recreation grounds, periodic markets or events along with technical ones like sewage interceptors and ecological interventions need to be seen in tandem. Projects like the network of cycling and pedestrian pathways along the network tributaries draining into the river, proposed by *Morphogenesis*,⁵³ are illustrative of this approach. The *Yamuna-Elbe Public Art Project*, held in 2011 end, was another initiative to bring the people of the city to the river, to see it, touch it and acknowledge its presence or lack of, rather.

In the city, the concept of nature becomes as much a human idea as a non-human thing and environmentalism as much a cultural prospect as a natural one.⁵⁴ Nature emerges as an important symbol of community in the urban setting. The cleaning, beautification and cultural-commercial programming of rivers and other natural features have been used to evoke the revitalization of many cities. The recent discourse around the cleaning and development of the *Mithi* River in Mumbai and the *Sabarmati* riverfront development in Ahmedabad, are examples that indicate how intertwined rivers continue to be with the lives of the cities through which they flow, and that the renewal of the river is also seen as renewal of the city.

The unique location and terrain of the Delhi plains ensure that the River has and will continue to be one of the most important elements of urbanization and development in the city. In the contemporary city, the river has been ‘commodified’, and more long-term, democratic and sustainable ways of engaging with the river need to be imagined.⁵⁵ Given the ongoing re-centering of the river in the city’s plans, albeit for diverse and disparate agendas, the time is ripe for an intelligent revival of the river- which has the potential of acting as a metaphor for the renewal of the entire city.

NOTES AND REFERENCES

¹ The *Delhi Sultanate* is a term used to cover five short-lived; Delhi based kingdoms or *sultanates*, of Turkic origin in medieval India. The sultanates ruled from Delhi between 1206 and 1526, when the last was replaced by the *Mughal* dynasty

² Known to have been continuously inhabited since at least the 6th century BCE, present day Delhi is said to have been the site for at least seven historic cities

³ Another feature that made the geographical location of the Delhi plains attractive to various settlements was its low lying level in the North Indian River Plain, making it a catchment basin or bowl with water flowing towards it at a subterranean level. The Delhi Ridge, due to its porous nature is an invaluable groundwater sanctuary and recharge zone. Rich alluvial aquifers and underground streams can be found in the Central Delhi Plains, which were also fed by the Yamuna flood plains towards the east.

⁴ White Paper on Pollution in Delhi with an Action Plan, 1997

⁵ Hindi for Red Fort

⁶ Also known as *Kishangarh* Forest, the forest constitutes the major chunk of what is today known as the South-Central Ridge

⁷ *Indraprastha*, the name for the legendary city built by the *Pandavas*, as per the ancient Indian text *Mahabharata* is said to have existed 5000 years ago at present Delhi. Though some archaeological evidences have been found to support this belief, it is considered a part of mythology due to lack of convincing tangible proof of its existence.

⁸ ‘*Tal*’ and ‘*Kund*’ in Hindi refer to a water reservoir. The remnant of *AnangTal* can be traced to the water body next to the ancient *Yogmaya* Temple in present day *Mehrauli*. *SurajKund*, a semi-circular water tank 5km from the historic city of *Tughlaqabad* is the site of the annual *SurajKund* Fair today

⁹ The Tughluqs (1320–1414) were a Muslim family of Turkic origin whose rule of North India started in Delhi

¹⁰ In 2000, Architects Danny Cherian and Anjali Aggarwal discovered 15 historic water harvesting dams along 40 miles of the Delhi Ridge, hitherto unknown to Archaeological Society of India, providing empirical evidence of this network which would have sustained urban life in medieval Delhi, “Medieval Bundhs may hold key to Water Problem”, Shobha John, Times of India, Aug 19, 2001.

The documentation for the same has been studied from Cherian, Danny, Thesis- “*Pairing Mega Events and Hydrological Systems for Urban Sustainability- Strategy Framework for Delhi Beyond the Commonwealth Games 2010*”, Department of Urban Studies and Planning, Massachusetts Institute of Technology, September 2004

¹¹ Hindi for ‘seven bridges’, Satpula is a water harvesting dam with sluice gates, built by the Tughlaq dynasty during the 14th century, “*Hydraulic Architecture in Medieval India: The Tughlaqs*”, Environmental Design- Water and Architecture, Journal of the Islamic Environmental Design Research Centre

¹² One of Delhi’s historic cities, built by *Muhammad bin Tughluq* (1325–1351)

¹³ The *Mughal* Empire was the dominant power in the Indian subcontinent between the mid-16th century and the early 18th century, before it was supplanted by the colonial *British Raj*

¹⁴ Sinha, Amita and Ruggles, D.Fairchild, “*The Yamuna Riverfront, India: A Comparative Study Of Islamic And Hindu Traditions In Cultural Landscapes*”

¹⁵ Named after the number of arches, similar to *Sat-Pullah* [Seven- Bridge], *Ath-Pullah* [Eight- Bridge] and *Barah-Pullah* [Twelve- Bridge] are used by pedestrian traffic today, located in Lodhi Garden and over the storm water drain of that name, respectively.

¹⁶ Though the exact reasons for this are unknown, it could be due to non-potability of the water in the adjacent stretch of the river.

¹⁷ Even today, a major component of the city's water supply demands are met through this canal which enters the city at *Haidarpur* in the north.

¹⁸ "*The Water and Landscape Heritage of Mughal Delhi*", James L. Westcoat Jr., Aga Khan Program for Islamic Architecture at MIT, October 2011

¹⁹ Article in Indian Express, "Raj Relic: Civic Body Stumbles on Unknown Sewer Network", September 14, 2010

²⁰ Rajagopalan, Mrinalini, Ph.D., University of California, Berkeley, "*The modern lives of medieval monuments: The intersection of nation and aesthetics in Delhi, India*", 2007

²¹ Op.cit., Cherian, *Curzon Road/ Great College Street-Metcalf Road*, today known as *Kasturba Gandhi Marg*, which connects *Connaught Place* to *India Gate*, was built over. *Queen Victoria Road*, today known as the *Dr. Rajendra Prasad Road*, and *King Edwards Road*, now known as the *Maulana Azad Road*, were built over the *Talkatora* and *Kushak Nallahs* (Hindi for storm water drains). *Ashoka Road* buried the *Khillauli Bagh* stream.

²² Gole Market, Hindi for 'Circular Market', is a middle-class locality in the heart of Delhi, that grew around the octagonal market, by that name, designed by Edwin Lutyens in 1921 within a traffic roundabout.

²³ Op.cit., Cherian

²⁴ Sharan, Awadhendra, "In the City, Out of Place- Environment and Modernity, Delhi 1860s to 1960s" Lahiri, Nayanjot, "Delhi's Capital Century (1911-2011)- Understanding the Transformation of the City", Colloquial Program for Agrarian Studies, Yale University, 2011

²⁵ King George V announced the shift of the capital of the British Empire from Calcutta to Delhi in his Coronation speech on 12 December 1911. There has been much hype and celebration on the completion of 100 years of Delhi as capital in December 2011; which is being largely criticized as disregard for the erstwhile historic capital cities of Delhi and ignorant lauding of imperialism. Refer Hashmi, Sohail, "*From Dehli to New Delhi, it wasn't 1911*", *Kafila*, December 13, 2011; Vij, Shivam, "*Celebrating 100 years of New Delhi: Absurd, Ahistorical and Unseemly*", *First Post India*, December 13, 2011

²⁶ Commonly used term used to describe the partition of British India into three parts on the basis of religious demographics. This led to the creation of the sovereign states of the Dominion of Pakistan (later the Islamic Republic of Pakistan) and the Union of India (later Republic of India) which took place in 1947, on August 14th and 15th, respectively.

²⁷ Soni, Charu; *Killing Delhi's Lifeline*, *Tehelka*, Aug 19, 2006

²⁸ Op.cit., Cherian

²⁹ Local name for 'residential estates'

³⁰ *Sewa* [Hindi for 'service'] *Nagar* [Hindi for 'town' or 'district'] and *Vinay* [Hindi for 'humility'] *Nagar* were so named because it was where peons, clerks etc. lived while the joint secretaries and directors were housed in *Maan* [Hindi for 'respect'] *Nagar* and *Shaan* [Hindi for 'pride'] *Nagar*.

After Nehru, the then Prime Minister of India, criticized the then minister for PWD and rehabilitation, Meher Chand Khanna, for naming the colonies thus; *Maan Nagar* and *Shaan Nagar* were renamed to *Ravindra Nagar* and *Bharti Nagar*, "Delhi, a city of refugee enterprise", *Times of India*, Jan 24, 2010

What is today known as *Sarojini Nagar* was called *Vinay Nagar* and *Laxmi Bai Nagar* was called *East Vinay Nagar* and *Netaji Nagar* was called *West Vinay Nagar*.

³¹ Dupont, Veronique, “*Socio-spatial differentiation and residential segregation in Delhi: a question of scale?*”, Institut de Recherche pour le Developpment & Centre for Indian and South Asian Studies, Paris, GeoForum 35, 2004

³² “The south is for the elites, other areas for the poor” Schenk, Hans, “Migrants, Squatters and Evictions”

³³ Gita Dewan Verma, Delhi based planner, “to label riverbed cultivators encroachers is preposterous since theirs is the most legitimate land-use in the riverbed according to the MPD and the CGWA. If anything, there is a strong case for restoring the riverbed to such cultivation after encroachment clearance”, *Beautification Drive*, Down to Earth, May 15, 2004

³⁴ This contradiction is evident in the following provisions in its section on ‘Public Utilities and Services’-
“The existing power house, being too near *Rajghat*, will continue till such time as the machinery becomes obsolete, so that the *Rajghat* site will be completely open to the river. A new site has been earmarked for the location of a big thermal plant south of the present site as it will need constant and large supplies of water from the river and also a railway siding for coal. Land for housing the essential staff and for the future expansion of the plant has also been provided at the new site.” and “A site near the Yamuna bridge has been recommended for an electric crematorium which is so essential for a big city like Delhi.” Page 37, Delhi Master Plan 1962

The ‘existing power house’ in the first quotation refers to the *Rajghat Plant* which was a steam generation power plant shifted from *Kingsway Camp*, now known as *Guru Teg Bahadur Nagar (GTB Nagar)*, around 1931, when the capital of India was shifted to New Delhi, and was known as the Central Power House. Instead of discontinuing this Plant, a coal based Thermal Power Plant was set up at the same site, with two new units of 67.5 MW to replace the old ones.

³⁵ Badarpur 3,500-4,000 TPD, Indraprastha 1,200-1,500 and Rajghat - 600-800 TPD, *White Paper on Pollution in Delhi*, 1997, Ministry of Environment and Forests, Govt. of India.

³⁶ Various localities of artisans, cobblers and other economically weaker sections of service providers were cleared in 1936. Even the Lodhi Garden was laid out as per the instructions of Lady Willingdon, wife of then Viceroy of India, by evicting a village situated around the tombs

³⁷ Shenck, Hans, “*Towards Apartheid- Policies of Segregation and Deprivation in Delhi*”, Urban Development Debates in the New Millenium- Studies in Revisited Theories and Redefined Praxes, ed. Gupta, K.R., 2004

³⁸ Shukla, Shikha and Singh, Kishore Kumar, “*Profiling ‘Informal City’ of Delhi- Policies, Norms, Institutions and Scope of Intervention*”, WaterAid India, 2005

The list of large scale encroachments on Delhi’s ecology include institutional buildings, malls and hotels on the Ridge, and a Temple complex, housing complex and metro station on Yamuna’s floodplains. *Sainik Farms* is the most notorious example of encroachments by the affluent that have been ‘overlooked’. An illegal settlement in South Delhi, it is a large tract of land that was to be left to maintain the greenery. However the rich and powerful bought tracts of land there ostensibly to farm but built huge mansions there.

³⁹ The first resettlement drive in Yamuna Pushta took place in 1967, and the residents of the slum near *Nigambodh Ghat* were settled in *Welcome Colony* in East Delhi. However, with more migrants regularly pouring in, these slums kept on refilling; and the 1982 Asian Games saw nearly a million migrant laborers coming in to construct games related infrastructure.

⁴⁰ Menon-Sen, Kalyani; Bhan, Gautam; *Swept off the map: surviving eviction and resettlement in Delhi*, Yoda Press, 2008

⁴¹ Rashtriya Sahara, January 25, 2012

⁴² Op.cit., Cherian

⁴³ “The Olympics provided a justification for the redevelopment of the [Barcelona Olympics Games village] site involving the restructuring of the rail network, the building of a coastal ring road, the development of the Olympic Village and a new marina (Olympic Harbour), the restructuring of the sewage system and the regeneration of the coastline. The development opened up the city to the sea by improving access to 5.2 km of coastline for the inhabitants of the metropolitan area. Here the new beaches and waterfront facilities have transformed the landscape and will potentially alter the shape of the future growth of the city.” Essex, Stephen and Chalkley, Brian, *“Olympic Games: Catalyst of Urban Change”*, Department of Geographical Sciences, University of Plymouth, Drake Circus, Plymouth, PL4 8AA, Devon, UK

⁴⁴ Previously called the *Indraprastha* Stadium, after the ancient city of Delhi

⁴⁵ Uppal, Vinayak and Dr. Ghosh, Debjani, “The Impact of the Commonwealth Games 2010 on Urban Development of Delhi- an analysis with a historical perspective from Worldwide experiences and the 1982 Asian Games”, National Institute of Urban Affairs, WP 06- 12, December 2006

⁴⁶ One acre comprises 4,840 square yards, 43,560 square feet or about 4,047 square metres (0.405 hectares)

⁴⁷ The term ‘village’ would indicate a low height, low density sustainable settlement

⁴⁸ Suresh Kalmadi, the Games Organising Committee chairman, was arrested in April, 2011 Kalmadi for awarding illegal contracts to a Swiss firm for Timing-Scoring-Result (TSR) system for the 2010 Commonwealth Games causing a loss of Rs 95 crore to the exchequer.

⁴⁹ ‘Nallah’, Hindi for ‘drain’, is an apt usage for this historic storm water drain

⁵⁰ Gottlieb, Robert, *“Reinventing Los Angeles: Nature and Community in the Global city”*, Cambridge, MIT Press, 2007

⁵¹ Sethi, Aman, *“A Site for Contestation,”* Frontline , Vol. 22, Issue 15, July 2005

⁵² The Master Plan 2001 refers to “channelization” of river Yamuna in following terms: “Rivers in the major metropolitan cities of the world like Thames in London and Seine in Paris have been channelized providing unlimited opportunities to develop the river fronts. After the results of the C model studies for the channelization of the river become available, development of river front should be taken up, considering all the ecological and scientific aspects, as a project of special significance for the city”.

⁵³ The *Delhi Nullahs* project was initiated by *Morphogenesis*, an architecture practice based in Delhi. It proposes to utilize the derelict network of storm water drains crisscrossing Delhi for eco-friendly transportation and recreation. The proposal envisages the ecological restoration of these ‘nullahs’, along with infrastructure up gradation, to create cycle, pedestrian pathway and public spaces, an alternative route of movement through the city. [Refer www.Delhinullahs.org]

⁵⁴ Cronon, Bill, as cited by Gottlieb, Robert

⁵⁵ “Among the many intersecting ways of making nature recognizable as a place of value- spectacular scenery, charismatic mega-fauna, religious significance, national prestige- commodification is only one...It is the conjuncture with the period of liberalization that has enabled the emergence of commodity aesthetics as the dominant form of imparting value to the river, allowing the Yamuna to be seen and imagined as a desirable place.” Baviskar, Amita, *“What the Eye Does Not See: The Yamuna in the Imagination of Delhi”*, Review of Human Affairs