

LANDSCAPE and/or INFRASTRUCTURE  
TWO DIFFERENT IDENTITIES??  
(the given title)

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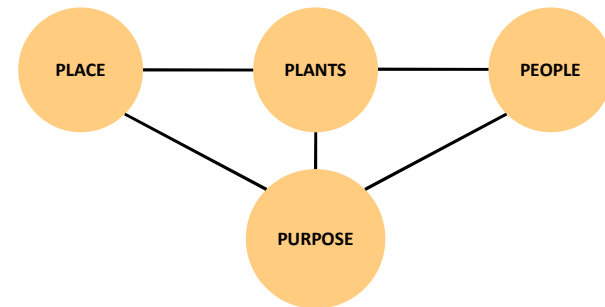
*Green Landscapes and Biodiversity  
September 28, 2019*

WHAT'S IN A NAME??

### TREES AND GREEN, WITH A HINT OF BLUE



### UNDERSTANDING AND DESIGNING LANDSCAPES



UNDERSTANDING AND DESIGNING LANDSCAPES

PLACE



UNDERSTANDING AND DESIGNING LANDSCAPES

PLANTS



UNDERSTANDING AND DESIGNING LANDSCAPES

PEOPLE



UNDERSTANDING AND DESIGNING LANDSCAPES

PURPOSE





**LANDSCAPES ARE LIVING IDENTITIES**



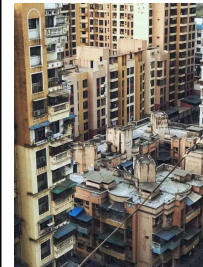
**LAWNS, FLOWERS AND SOME PLANTS**



### BIOPHOBIA

They paved paradise  
 And put up a parking lot  
 With a pink hotel, a boutique  
 And a swinging hot spot  
 Don't it always seem to go  
 That you don't know what you've got till its gone  
**They paved paradise**  
**And put up a parking lot**  
**They took all the trees**  
**And put them in a tree museum**  
**And they charged the people**  
**A dollar and a half to see them**  
 No no no  
 Don't it always seem to go,  
 That you don't know what you've got  
 Till its gone  
*(Big Yellow Taxi, lyrics, sung by Joni Mitchell, Canadian American singer)*

### BIOPHOBIA



## SUSTAINABILITY



## GREEN RATINGS



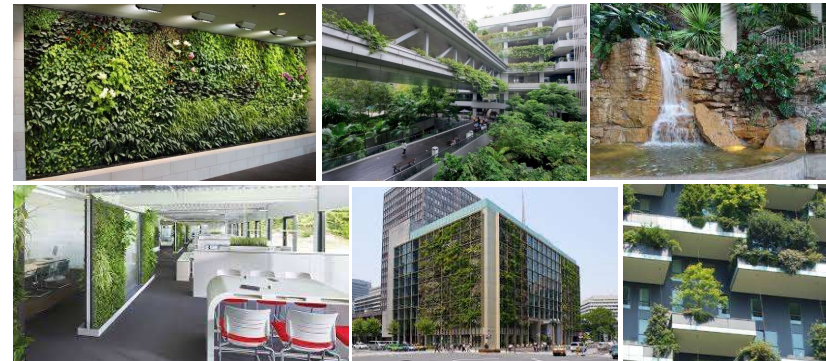
## BIOPHILIC DESIGN:

bi-o·phi·lic· de·sign    *noun*

Biophilic design, an extension of biophilia, incorporates natural materials, natural light, vegetation, nature views and other experiences of the natural world into the modern built environment.

EarthTalk.org

## BIOPHILIA





## BIOPHILIC CITIES



## WHEN THERE WAS NO SUSTAINABLE DESIGN, NO GREEN RATINGS AND NO BIOPHILIC DESIGN...



Are we not practicing the same principles and ethos that we always were?

So then, what's in a name?

And also, WHAT WERE WE PRACTICING?

**PAST CONTINUOUS, FUTURE PERFECT**  
Relearning the Concepts of Green Infrastructure from Indian Heritage



### PAST CONTINUOUS

The **PAST CONTINUOUS TENSE** describes actions or events in a time before now, which began in the past and is still going on at the time of speaking.  
In other words, it expresses an unfinished or incomplete action in the past.

Example: *We were taking care of our environment*

### FUTURE PERFECT

The **FUTURE PERFECT TENSE** refers to a completed action in the future. When we use this tense, we are projecting ourselves forward into the future and looking back at an action that will be completed sometime later than now.  
It is most often used with a time expression.

Example: *We will have cared for our environment*

In an abstract sense, the title implies that if we, **landscape architects, trained professionals of a design discipline that directly interacts with nature, people and culture**, continue to use the valuable lessons of our past in the present, we are virtually assured of a perfect future!

*(Title credit: Past Continuous Future Perfect is the theme of the 10<sup>th</sup> edition of the annual students' design competition organised by the Landscape Foundation India. Further details of the competition and the winning entries can be seen on [www.landscapefoundation.in](http://www.landscapefoundation.in))*

## GREEN INFRASTRUCTURE

**GREEN INFRASTRUCTURE** or **BLUE-GREEN INFRASTRUCTURE**, as we understand it today, is described as a network providing the ingredients for solving urban and climatic challenges by building with nature.

It is also defined as an **approach to water management** that incorporates both the **natural environment and engineered systems** to provide clean water, conserve ecosystem values and functions and provide a wide array of benefits to people and wildlife.

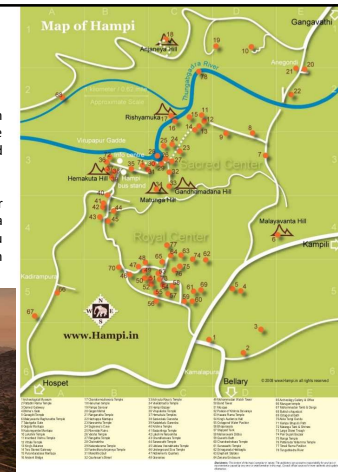
## HERITAGE

In simple terms, **HERITAGE** is anything that is considered **important enough to be passed on to the future generations**

### HAMPI: THE LOCATION AND HISTORY

Located in the State of Karnataka in southern India, about 350 kilometers north of Bangalore, the [Hampi World Heritage Site](#) rests on the banks of the Tungabhadra river and is spread over two administrative districts, Bellary and Koppal.

While Hampi is mostly known as the capital of the Hindu empire, Vijayanagar which ruled peninsular India during 14th to 16th century AD, the site also has a history dating long before the Vijayanagar Empire, associated with the Hindu mythological landscapes of Pampakshetra and Kishkinda (the Monkey Kingdom of Ramayana), highly revered and visited by Hindus from all over the country.



## HAMPI: THE SETTING

The environment of Hampi is a complex theatre including natural, cultural and social components spread over the Sacred Centre and the Royal Centre, the two key built components nestled in the rocky hills with the river as its edge. The built fabric of Hampi and its relation to the larger landscape systems is an illuminating example of a bustling metropolis in perfect sync with its immediate nature. Whether it is the visual or the physical aspects, driven by resource or function, each component of the built heritage of the erstwhile capital city of the Vijayanagar Empire is carefully modulated so as to cause the least conflict with the rhythms



## HAMPI: THE STORY

**14<sup>th</sup> to 16<sup>th</sup> Century** – A thriving city with abundance of water and agricultural produce, architecturally and culturally rich

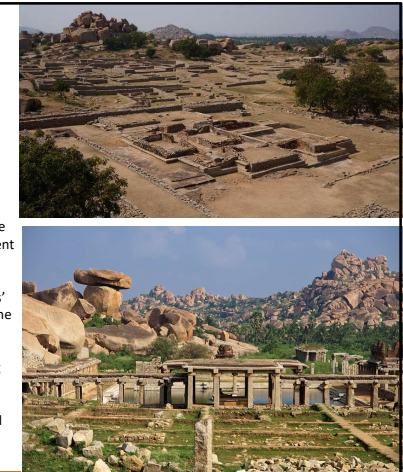
**1565** - The Vijayanagara empire ended after being attacked and plundered by the Sultanate

**Late 19<sup>th</sup> Century to 1903** (Pre-independence) - the monuments were protected by the then Archaeological Survey of India under the Ancient Monuments Act (1903-04) by the British-Indian government

**1956** (post independence)- Ancient Monuments Act; 56 'monuments' declared as nationally protected monuments and 700 protected by the Karnataka State Department of Archaeology under its Act

**1980**- Beginning of the International Documentation project bringing The place into international focus

**1986**- Inscription of the Group of monuments of Hampi on the World Heritage List



## HAMPI: PLANNING PRINCIPLES TO LEARN FROM

### Key values of the Town Planning

- The key components of the larger landscape, i.e. the hills, the boulders, the riverfront are left untouched. The fertile valleys with the best soil cover are used for productive agriculture sustained by a network of irrigation canals. The built components of the urban system – the bazaars, housing and other civic structures are embedded in the 'remaining lands'
- Agglomeration of small URBAN CORES, NOT a uni-centered capital city. Each urban core had a centrality of its own
- Each URBAN SETTLEMENT was defined and dominated by a temple complex dedicated to the presiding deity and a large bazaar street axial to the temple. All other components of the town i.e. housing, workspaces and markets were stretched along and behind the axial bazaar.

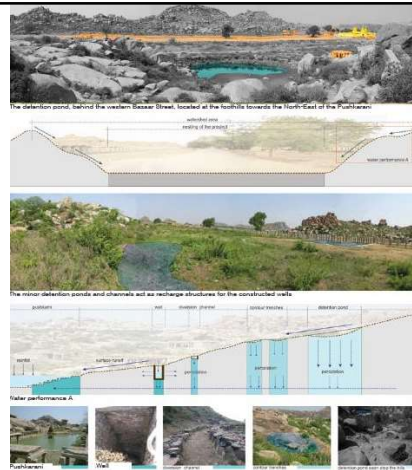
Such a planning principle is not merely a random order thrust upon the city and the region but was born out of close interaction with and as a response to the topography and the regional landscape.



## HAMPI: PRINCIPLES TO LEARN FROM

### Water Systems

- The city did not use the river as a source for its domestic water needs. Barring irrigation requirements, the river remained mostly untouched. This is a remarkable achievement for a city set in a semi-arid region with an annual rainfall of 560mm spread over 40 days.
- Throughout the expanse of the city, NO standardized models and solutions of rainwater harvesting as used. Rather, patterns are tailored specifically to the terrain with myriad solutions for managing, harvesting and storing rain water.
- The water harvesting system comprises of the Pushkarni (main tank) as well as contour bunds, trenches, detention ponds, recharge pits, open wells, swales, seasonal wetlands, etc.



## HAMPI: PRINCIPLES TO LEARN FROM

### Agricultural Systems

Based on the irrigation patterns created by the river flow and the canals, crops were traditionally grown according to the type of lands:

- Dry lands without irrigation: Chola, ragi, cotton, indigo, wheat and flax
- Wet lands with irrigation: Paddy and sugar cane
- Garden lands: Coconut, betelnut, banana, nut trees, turmeric, chillies, onion, hemp, coriander, vegetables

This system provided for all the needs of the population and more.



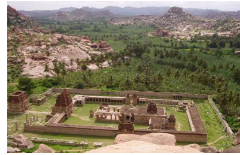
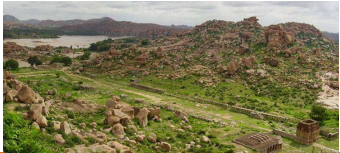


## HAMPI: THE WORLD HERITAGE SITE



### HERITAGE COMPONENTS

- The Ruins
- The Archaeological and Excavated Sites
- The Sacred Structures
- The Gateways
- The Royal Structures
- The Valleys, the Temple and the Bazaar
- The Cultural Landscape



## HAMPI: THE WORLD HERITAGE SITE

### HERITAGE COMPONENTS

- The Water Systems
- The Living Villages
- The Vernacular Architecture
- The Arts and Crafts
- The Folk Traditions

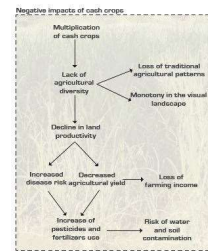
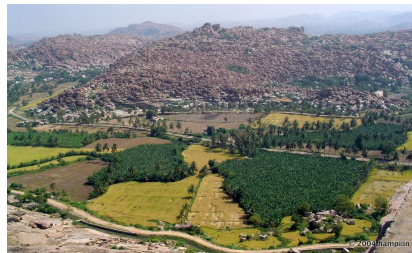


### HAMPI: CURRENT THREATS

Construction of the dam across the Tungabhadra river has made water more easily available to Hampi – for domestic as well as irrigation use. As a result, the resource is less valued than before.

#### Shaped landscapes

Landscape shaped by agriculture is structured by a mosaic of natural and manmade patches whose size, shape and spatial organisation vary. These landscape patterns directly influence larger ecological systems in terms of water runoff, erosion, soil nutrients, animal movements, etc.



### HAMPI: CURRENT THREATS

#### Effects of ineffective water resources management



#### Tourism development

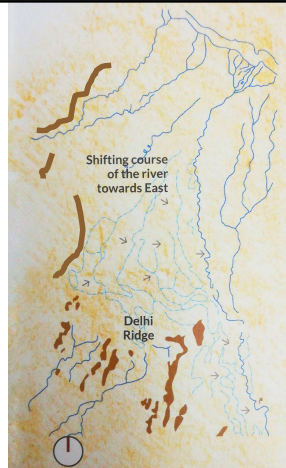
Tourism movement needs to be anticipated and planned at a larger level in conjunction with the environment and existing communities. Threats are disturbance/depletion of natural resources, conflicts with local residents, pollution, obstruction of physical and visual linkages in heritage areas.

### DELHI: THE STORY

Delhi is a living city. Diverse historical, cultural and environmental exigencies have created the city that is today recognized globally as the capital of an important developing nation.

Delhi's aura of a capital city goes back many centuries and it has been the capital of significant kingdoms and sub-continental empires, which in many ways facilitated the development of a cultural synthesis that flowered into a sophisticated and mature form and in turn exerted an influence over a wide geographical area.

Today, covering an area of nearly 1500 square kilometres and home to 20 million people, it accommodates the remains of over a thousand years of building in different states of preservation.



### DELHI: THE SETTING

Set on the banks of the river Yamuna, which along with the Ganges forms the major river system in North India, it lay in a bowl cradled by the hilly Ridge (spurs of the Aravalli, the oldest fold mountains in India) on the northern, western and southern sides.

The Ridge and the river formed a network of ponds, lakes and canals and framed the triangular alluvial region.

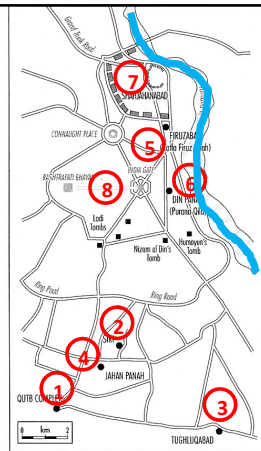


## DELHI: THE HISTORY

Historical records show that Delhi has been the seat of power for many a kingdom and empire from 1100 AD till date.

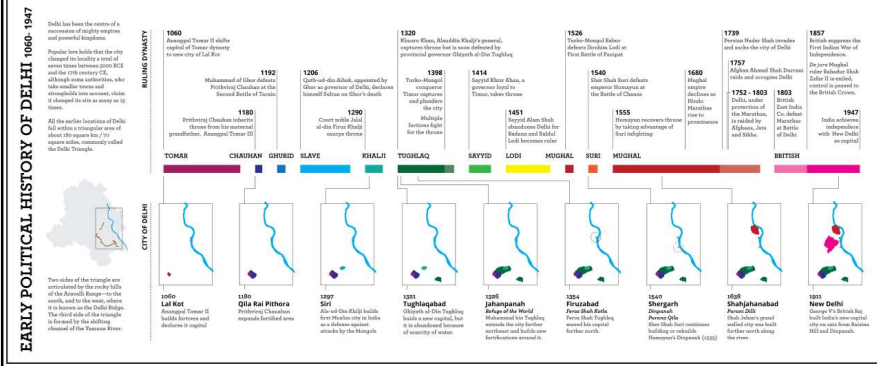
A timeline study of the period shows Delhi under the rule of various kings/generals/governments from the Rajputs (Tomaras and Chauhans), the Delhi Sultanate (Mamluks, Khiljis, Tughlaqs, Sayyids, Lodis and Suris) and then the Mughals followed by the British and finally the city was declared the capital of independent India. The eight cities of Delhi between 1000 AD and 1947 are:

1. Qila Rai Pithora or Lalkot
2. Siri
3. Tughlaqabad
4. Jahanpanah
5. Firozabad
6. The city around Purana Qila (Din Panah)
7. Shahjahanabad
8. New Delhi (under British rule and then capital of independent India)



Seven cities of Delhi (based on Keay, India: A History, p. 273)

## DELHI: THE HISTORY

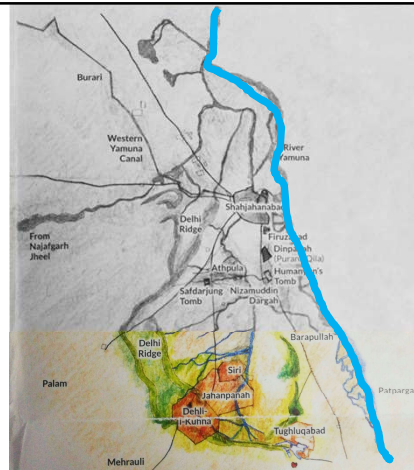


### DELHI: THE FIRST SETTLEMENTS

As ruler after ruler established his kingdom in Delhi, the initial settlements were first seen nestled in the southern ridge. The Ridge had forests, groves, orchards and grazing grounds and there were levelled areas which were cultivated as agricultural fields by irrigating them. There were natural streams, channels and ponds and many of them drained into the Yamuna on the east.

Water harvesting in this region was given immense importance and several tanks, baolis, moats around forts (Tughlaqabad and Adilabad) and bridges across streams (Athpula, Barapulla) were constructed.

It is apparent that there was a self-sufficient public system of water management present at that time. Till the 16<sup>th</sup> century, the Yamuna riverbank was not even envisioned as a potential site for imperial capitals.

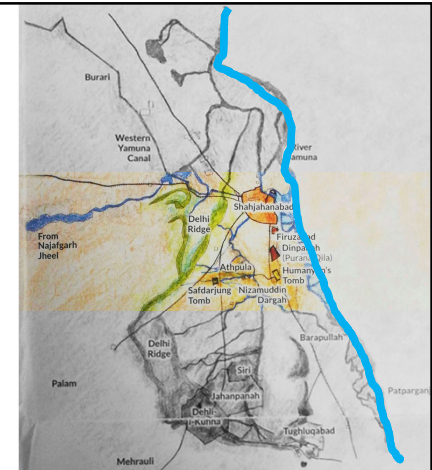


### DELHI: 17<sup>th</sup> CENTURY ONWARDS

From the early part of the 17<sup>th</sup> century, the cities of Dinpanah, Firuzabad and Shahjahanabad were sited on the eastern banks of the Yamuna river.

This region too had a variety of topographic features such as ridges, valleys, low and high hills, and tributaries of the river that facilitated the creation of depressions and stream corridors which were able to take care of the surface run-off during brief periods of rain.

Delhi's water system continued to comprise of a network of tanks, baolis and wells and local catchment basins, mainly aligned with the topographical features of the Ridge and not relying on the river for both water demands or surface drainage.





### DELHI: 17<sup>th</sup> CENTURY ONWARDS

However, the establishment of the capital city along the riverside still remained a strong symbolic gesture – controlling the river, by restricted public access which was now regarded as a sovereign prerogative. In time to come, a few settlements came up on the eastern banks of the river as well and soon, the river was used for transporting supplies to the walled city.

Thus, over time, the two prominent natural features of the city – the river Yamuna and the Ridge – exchanged places in the siting of settlements and imperial spaces and the social and economic culture of the city.



### DELHI: THE DECLINE OF THE RIDGE

The role of the Ridge forest till late 19<sup>th</sup> century was ecological, productive and recreational. Parts of it were cleared to make way for agricultural fields in the southern side. It also housed many hunting grounds and serais.

As imperial cities moved towards the banks of the Yamuna, the southern ridge suffered neglect and deforestation. It, however, was still a source of groundwater.

In the 19<sup>th</sup> century when the British came, there was a drastic change in the character of the relationship that the authorities shared with the Ridge and the River.

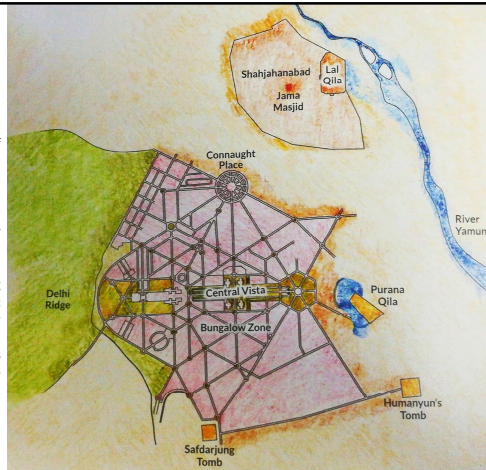




### DELHI: ADVENT OF THE BRITISH

The British Civil and military 'Lines' were situated in the northern Ridge. The Ridge itself was the site of the battle to control the city. It was declared a Reserved Forest under the provisions of the Indian Forest Act, 1878. The main objectives were the need to ensure steady supplies of timber for public works and stability of regional climatic conditions, water supply and soil fertility.

Later, in the early twentieth century, while designing the new capital, the Ridge became a majestic backdrop to the new city. It was afforested by planting various exotic species including *Prosopis juliflora*, a Mexican tree now known in India as *vilayati* (foreign) *kikar*, which created extensive monocultures.



### DELHI: THE DECLINE OF THE WATER SYSTEMS

There were drastic changes in the form of the water supply systems. The traditional water harvesting system comprising wells, baolis and tanks, fell into neglect. It got totally disrupted over the years and became defunct. Open nallas turned into open sewers. Large water bodies such as the Najafgarh Jheel and many others, gradually dried up. The decline of the water system that had survived for more than one millennium, had already started, never to recover again.

In 1863, a Municipality was constituted, with one of its responsibilities being to develop a water supply system for the city and the Civil Lines with the Yamuna as the main source. Water was delivered from the river through a centralized system of distribution controlled by the Municipality. The new water supply and drainage systems further negated the role of the traditional water systems. The control of the river took the form of embankments to prevent the meandering and the constant eastward shift of the river.



### DELHI: THE OVER-BURDENED RIVER

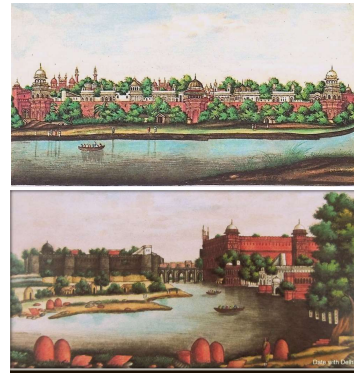
In addition to the centralised water supply system, later, during the construction of New Delhi as a capital in the 1920s, water sewage system was introduced for the first time in the city.

The river started performing multiple roles - feeding agriculture, facilitating transport, supplying water and sewage catchment. The idea of the British to develop the eastern side of the Yamuna, a low-lying area, was never abandoned in the new city planning. After the making of the Yamuna embankment after the flood of 1955-56, east Delhi came to be settled in a major way.

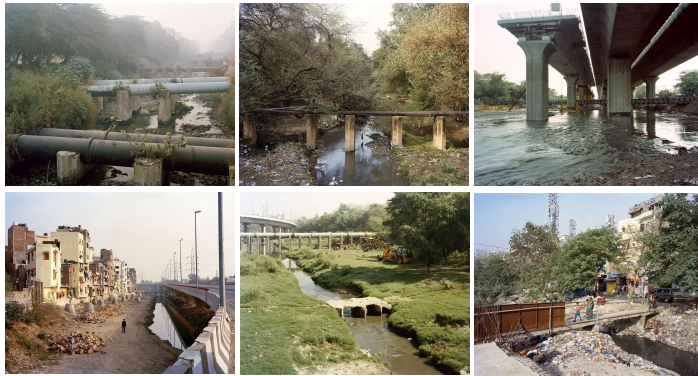
After India's Independence in 1947, Delhi became a refugee city with many colonies coming up to house those displaced by Pakistan during Partition. It exploded into a megacity with severe stress on its natural resources. The Ridge became prey to rampant urbanization and gradually became fragmented. Its ecology got disrupted with indiscriminate and unscientific denudation of forests.



### DELHI: THE RIVER AND THE CITY – THEN AND NOW



### DELHI: STATE OF THE NALLAS (NATURAL WATER CHANNELS) TODAY



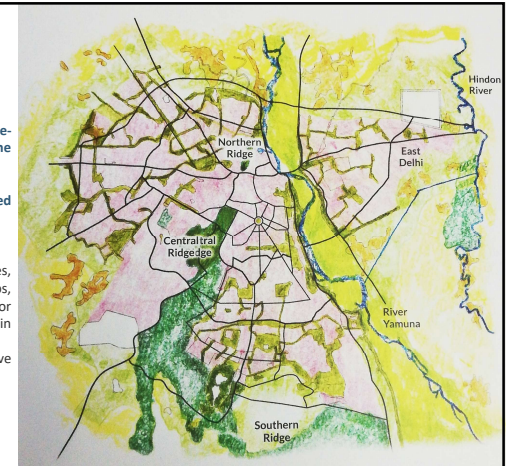
### DELHI: ALL IS NOT LOST YET...

The city still has the Ridge and the River...  
It needs a patient, undying, honest and whole-hearted attempt at ecological revival, based on the lessons of the past.

Some of the immediate actions that can be initiated are:

#### Restoring Biodiversity

Typically, degraded ecosystems are missing species, groups of species, or even whole functional groups, such as top-level predators. Sowing native seeds or transplanting individual plants is one step in restoring biodiversity, especially in the ridge area. Native flora is bound to create habitats for native fauna, thereby initiating recovery of the ecosystem.



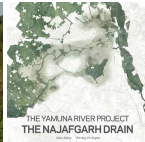
## DELHI: ALL IS NOT LOST YET...

### Restoring Function

Putting species back on the landscape can be like putting all of the pieces of a watch on a table and expecting it to work. There are complex interactions, such as resilient food webs and nutrient cycles, that need to resume in a restored environment. One way to restore function is to recreate disturbance regimes, or episodes of temporary environmental change, that encourage historical succession patterns. For example, setting controlled burns clears underbrush, and in some plants, encourages growth or seed dispersal.

In rivers, releasing large amounts of water from a reservoir pushes sediments downstream.

In case of the river, it is imperative that the sources of pollution (many of which are outside the Delhi limits) are controlled in addition to any other cleaning action being taken.



### Restoring Connectivity

Restored ecosystems tend to be small and isolated, making genetic diversity and the integration of the restored area into the landscape important considerations. Ensuring healthy genetic diversity requires drawing from as wide a genetic pool as possible. It also requires creating physical connections for travel that allow the exchange of genetic information across the landscape. In practice, creating corridors of habitat between isolated islands of intact and restored ecosystems restores connectivity.

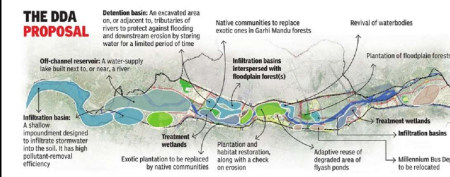
## DELHI: ALL IS NOT LOST YET...

### Ongoing Ecological

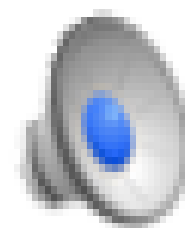
**Restoration Projects:**  
Aravalli Biodiversity Park  
Yamuna Biodiversity Park  
Yamuna River Project  
Najafgarh Jheel Revival



### THE DDA PROPOSAL



In conclusion,  
PAST CONTINUOUS, FUTURE PERFECT



And to answer the question  
LANDSCAPE AND INFRASTRUCTURE  
2 different identities??

**NEED NOT BE, SHOULD NOT BE**

*Thank you for a patient hearing!*

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