

# **REVIVAL OF HISTORIC GHATS OF KANPUR THROUGH LANDSCAPE DESIGN**

**MASTER OF LANDSCAPE ARCHITECTURE**

**UZMA MARIYAM**

2013MLA002



**SCHOOL OF PLANNING AND ARCHITECTURE, BHOPAL  
NEELBAD ROAD, BHAURI, BHOPAL - 462030  
MAY 2015**

## **Declaration**

I **Uzma Mariyam**, Scholar No. **2013MLA002** hereby declare that the thesis entitled **Revival of historic Ghats of Kanpur through landscape design**, submitted by me in partial fulfilment for the award of Masters in landscape architecture, in School of Planning and Architecture Bhopal, India, is a record of bonafide work carried out by me. The matter/results embodied in this thesis have not been submitted to any other University or Institute for the award of any degree or diploma.

22/5/2015

Uzma Mariyam

## **Certificate**

This is to certify that the declaration of Miss. Uzma Mariyam is true to the best of my knowledge and that the student has worked for one semester in preparing this thesis.

RECOMMENDED

Prof. Savita Raje

Professor

ACCEPTED

Ar. Savita Raje

Professor and Coordinator

Mater of landscape Architecture

Dr. Rachna Khare

Head

Department of Architecture

# REVIVAL OF HISTORIC GHATS OF KANPUR THROUGH LANDSCAPE DESIGN

A DESIGN THESIS

***Submitted***

*In partial fulfilment of the requirements for the  
award of the degree of*

**MASTER OF LANDSCAPE ARCHITECTURE**

By

**UZMA MARIYAM**  
[2013MLA002]

Under the Guidance of  
**Prof. Savita Raje**



**SCHOOL OF PLANNING AND ARCHITECTURE, BHOPAL**

**Neelbad Road, Bhauri, Bhopal (M.P.) 462030**

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Uzma Mariyam,  
2013MLA002



“The Ganga, especially, is the river of India, beloved of her people, round which are intertwined her memories, her hopes and fears, her songs of triumph, her victories and her defeats. She has been a symbol of India’s age-long culture and civilization, ever changing, ever flowing, and yet ever the same Ganga.”

-Jawaharlal Nehru- First Prime minister of India

## **ABSTRACT**

Kanpur has historical Ghats on the banks of river Ganga, with great mythological and cultural contexts, comparable to those of Varanasi and Haridwar. Built by patronage of wealthy devotees –Kings and merchants – for the benefit of the public, the Ghats were initially constructed for religious purposes and later being impressed by the appropriate geographical location of Kanpur, East India Company officials made Cantonment Chawni at Kanpur and developed Ghat area along river as a trade centre. Water was not only vital for sacred rituals, but also for domestic uses. It is said the thousands of people daily took bath on Ghats on that time .Ghats were living at that time.

Due to pressure of unplanned development, multifaceted reasons like pollution, change in occupation etc. The Ghats have lost their heritage and association with the people.

The aim of this thesis is to devise landscape design interventions towards enhancing the Pilgrimage / tourism experience of the historic Kanpur Ghats as cultural centre.



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## CHAPTER 1

### 1.0. INTRODUCTION

#### 1.1. Background:

Kanpur is the largest urban agglomeration in the Indian state of Uttar Pradesh, the second largest industrial city in North India and 10th biggest city in India with its own historical, religious and commercial importance. It was one of the main centres of the industrial revolution in India. It was known as "Manchester of the East". Kanpur is situated on the bank of the Ganges River which rises in the western Himalayas (Uttarakhand) and then comes to Gangetic plains of North India including Haridwar, Kanpur, Varanasi, Patna and then empties into the Bay of Bengal.



Figure 1 Location map of Kanpur

#### 1.1.1 Relevance of a town near Ganga:

---

All the places touched by this river became sacred because in Hindu mythology this river is said to be originated from Lord Shiva (Shiva's divine essence). Nothing is more stirring for a Hindu than a dip in the actual river, which is thought to remit sins of people. People travel from distant places to immerse the ashes of their kin in the waters of the Ganga; this immersion also is believed to send the ashes to heaven.



**Figure 2, Origin of river Ganga in Hindu Mythology**

### 1.1.2 Ghats

The Ghats (stone steps) are situated in specific locations along the Ganges and are an integral part of river life. Ghats facilitate the immersion and ablutions in the waters of The Ganga –an everyday practice for a Hindu devotee as well as for pilgrims who walk down the steps of the Ghats to bath and to carry the water to temples and to homes, for worship and purification rituals.

### 1.1.3 Kanpur Ghats

Built by patronage of wealthy devotees –Kings and merchants –for the benefit of the public, the Ghats were initially constructed for religious purposes and later being impressed by the appropriate geographical location of Kanpur, East India Company officials made Cantonment chawni at Kanpur and developed Ghat area along river as a trade centre. Water was not only vital for sacred rituals, but also for domestic uses such as daily bathing, washing clothes, cleaning the cattle. It is said the thousands of people daily took bath on Ghats on that time .Ghats were living at that time.



Figure 3 Sarsaiyya Ghat, Kanpur

#### 1.1.4 A sustainable device

Ghats allow and facilitate the connection between different realms: the urban, the sacred and the natural landscape. They link the urban domain and the natural landscape, and in a way form an integral part of these two domains that do not have well-defined borders which change with seasons and the different levels of the river.

The Ghats adapt to the dual role of protecting the bank and preserving the alluvial terrain that borders the river, preventing it from being washed away and allowing the water to spread onto it. There is continuity between the city and the river: the Ghats do not create a barrier; do not separate one space from another, the inner part from the outer: on the contrary they unite both domains.



Figure 4 Ghats of Kanpur



---

## 1.2 Present scenario of Kanpur

### 1.2.1 Kanpur- Most polluted town in Uttar Pradesh

Kanpur is the most populated town and with the steady growth of population, unplanned urbanization, agricultural and industrial activities it generates million of liters of sewage that is discharged through dozens of Drains into river Ganga. There are no such places called as open spaces for recreational activities and place have become just an industrial town without having its original sense of historicity and heritage.



**Figure 5** Various pollution sources into the river Ganga

### 1.3 Thesis concern and need-

A natural sewer, a garbage depot, a morgue and more....

Hordes defecating along the river, Cattle wallowing, washing of clothes, use of soaps and detergents are common sights at various bathing Ghats and elsewhere too.

All these non-point sources of pollution definitely add to the pollution of the river, besides posing very offensive and repulsive sights to the Ganga users as well common viewers. The situation has worsened to such an extent that the river not only has earned the reputation of being Dead but also having almost no aquatic life. The population of fishes and turtles has declined dramatically from toxic elements.

People no longer take boat rides in the river due to the repulsive odour and sight thus affecting the livelihood of the traditional boatmen. Many local businesses lost due to ignorance of people. All these Ghats are dead, disconnected with each other. Ganga mela is losing its originality because of river pollution and Degrading of Ghats. Association of people to Ghat is lost in past 50 years.

---

## **1.4 Aims-**

To devise landscape design interventions towards enhancing the Pilgrimage/Tourism experience of the historic Kanpur Ghats as cultural centers.

## **1.5 Objectives-**

- To understand the relationship of a settlement with a sacred river.
- To understand the role of Ghats in history and the present day relevance.
- To understand functions of Ghats as cultural centers.
- To devise landscape design interventions for re-establishing the river and Ghats as cultural centers.
- To apply the inferences in design of pilgrimage/tourist route along Ghats.

## **1.6 Scope and limitations-**

### **1.6.1 Scope (Site)**

- To do a detail study and research on Ghats
  - Landscape
  - Ecology
  - Socio-cultural aspect
  - Architectural features
- A regional level design solution for tourist/pilgrimage route along Ghats of Kanpur.

### **1.6.2 Scope (Design)**

- Scope of this thesis shall be based on landscape approach towards revival of Ghats as cultural centers.(Pilot project)

---

### 1.6.3 Limitations

- Study includes many stake holders, protection of everyone's interest is difficult
- Lack of proper documentation and drawings can affect this thesis.

## **1.7 Methodology-**

### 1.7.1 Literature review

- Review of historical books, miniature paintings, journals, articles on settlements and their relationship with Ghats.
- Case studies related to the city and sacred river interrelation.(Ghats of Varanasi)

### 1.7.2 Aims and Objectives framing

### 1.7.3 Data Collection

- Primary Data- Site visit , Survey (Analyzing the physical and socio-cultural characteristic )
- Secondary Data- Analysis of development of site with ages(Overlapping of development plans and maps)

### 1.7.2 Interpretation and Inferences

### 1.7.5 Design programme Formulation

### 1.7.6 Selection of area for design input

### 1.7.7 Design of a of Ghats (Pilot project)

### 1.7.8 Final Design

## **1.8 Outcome-**

- Models in landscape design intervention for revival of Kanpur Ghats along river Ganga, Sustaining it for the future.
- Highlighting Kanpur as major cultural centre of India.



---

## CHAPTER 2

### 2.0 Literature review:

#### 2.1. Hangang Renaissance Project (Center of Korea: Seoul & Hangang)

##### 2.1.1 Background

The Hangang River has witnessed the growth of Korea into an industrial and cultural powerhouse, a nation with a dramatic five-thousand-year history. In prehistoric times the river provided a much-needed fertile area of settlement, as indicated by the numerous prehistoric sites and relics that support this claim. The Hangang River later played a vital role in the rise of an early, agrarian civilization on its banks. Great kingdoms have risen and fallen along this commanding body of water. (Anon., n.d.)



Figure 6 Hangang river

### 2.1.1. Hangang History

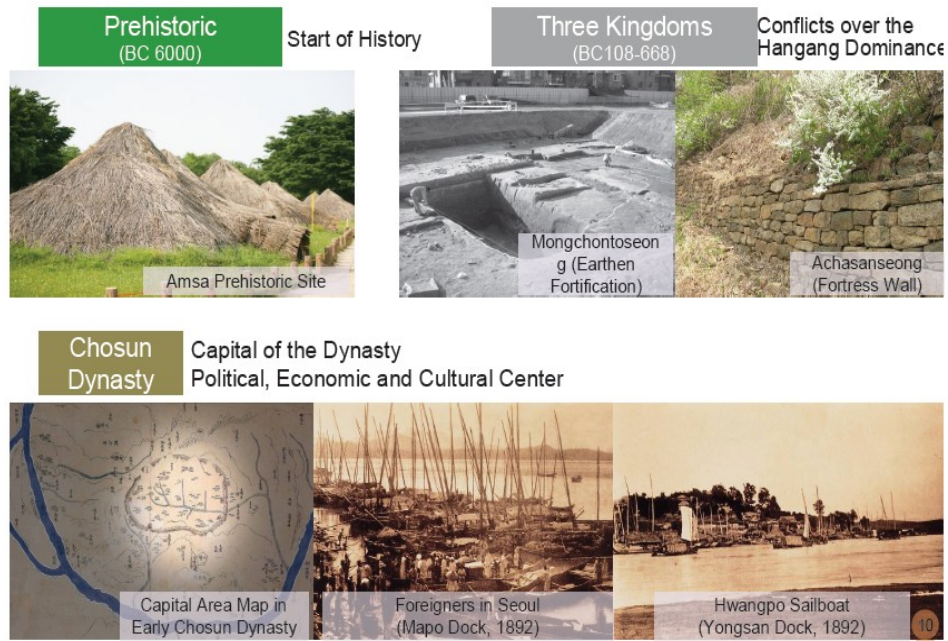


Figure 7 History of river Hangang

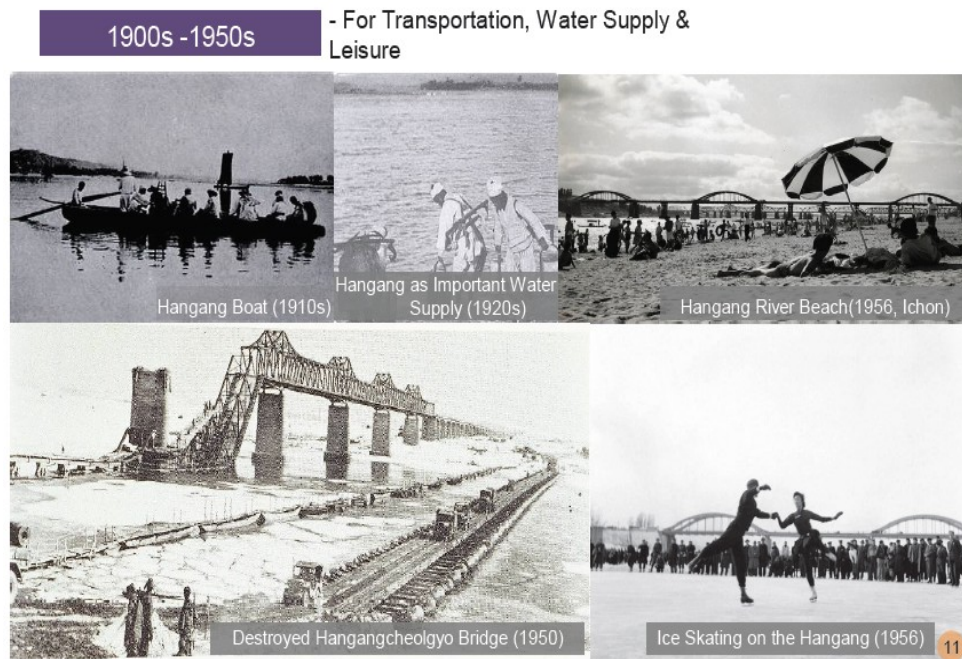


Figure 8 History of river Hangang

### 2.2. River of Life - River Han / Hangang

The Han River or Hangang (han means large, wide or long and gang means river) is South Korea's fourth longest river. It is formed by the confluence of the Namhan

---

River, which originates in Mount Daedeok in South Korea, and the Bukhan River, which originates on the slopes of Mount Geumgang in North Korea.

The river is known as the Han at the junction of the Namhan and the Bukhan at Yangsu-ri in Gyeonggi-do province. From there, it flows through Seoul, South Korea's capital city. Although it is not a long river, the lower Han is remarkably broad and within Seoul city limits it is more than 1km wide. The Han merges with the Imjin River shortly before it flows into the Yellow Sea (or West Sea as it is known locally). There are broad tidal flats at the mouth of the Han where it meets the sea. This area falls into the DMZ (demilitarized zone) that divides South and North Korea.

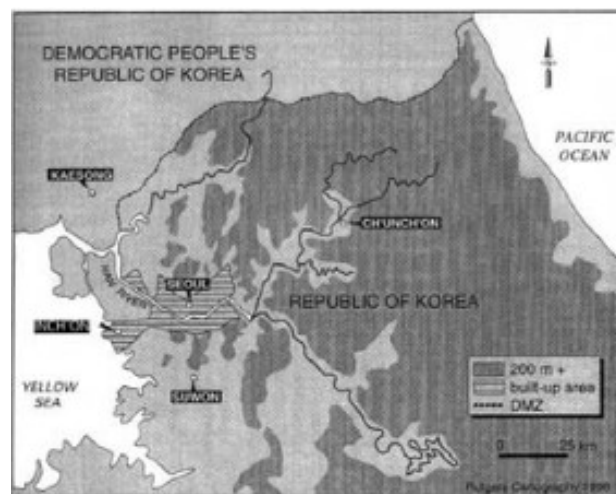


Figure 9 (Evans, 2009)

Of its 319 mile (514km) length, 200 miles (320 km) are navigable, and it has been a valuable river transportation route since ancient times, particularly during the Yi dynasty (1392–1910). Various agricultural products are grown in its drainage basin. The Han supplies the cities along its course with water for industrial and general use. The Han River and its surrounding area played an important role in Korean history and were used as a trade route to China (via the Yellow Sea). However, the river is no longer actively used for navigation, because its estuary is located at the borders of the two Koreas and is barred for entrance by any civilian. (Evans, 2009)



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## 2.3. Rapid Development

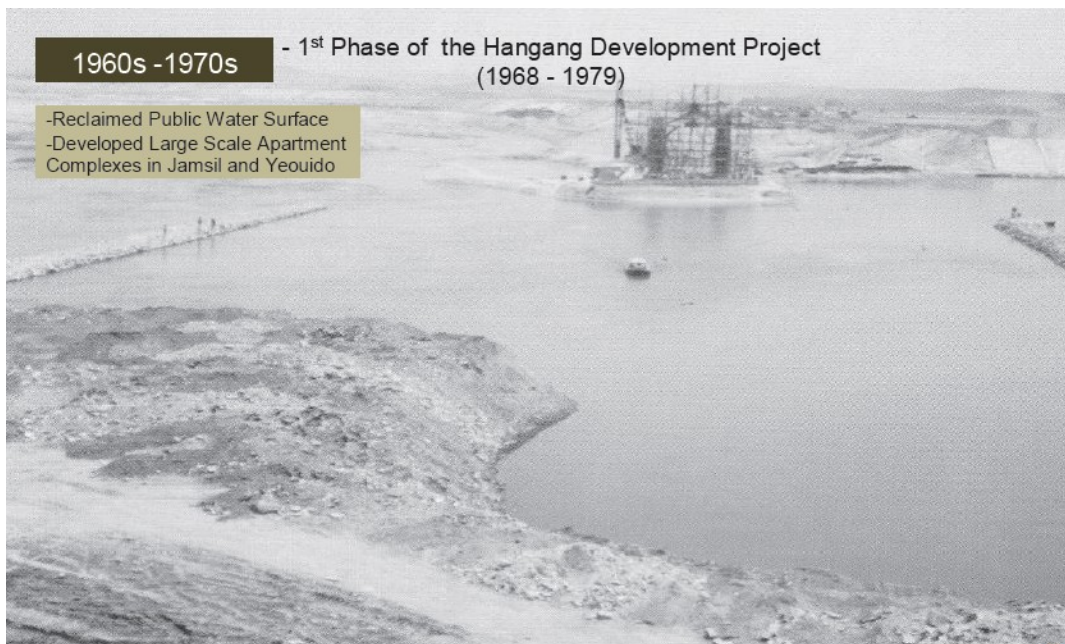


Figure 10 River Hangang



Figure 11 River Hangang

- Concrete riverbank protection
- Expressway along the river
- Residential area along the river

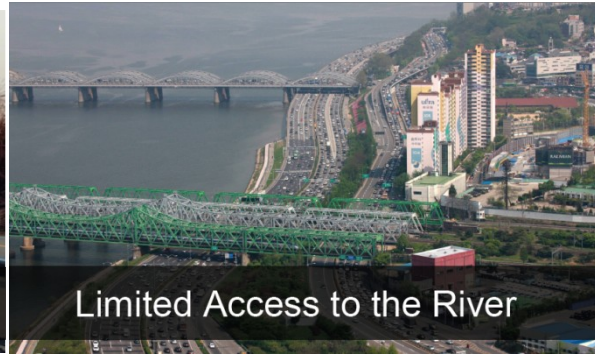


Figure 12 River Hangang

#### 2.4 Polluted River

During the first few decades of South Korea's existence the Han River became a byword for pollution, as burgeoning industry and an impoverished populace used it as a convenient spillway for industrial and urban refuse. Though it no longer plays a central role in commerce or transportation it is a prime fixture in the life of the South Korean capital and in the last decade has become the focus of government sponsored environmental efforts to clean it up and transform it into an ecological jewel of the capital. (project, Oct 10, 2011)



2.5. Reviving Hangang-(Hangang Renaissance Project)

2.5.1 Paradigm shift in Hangang Management

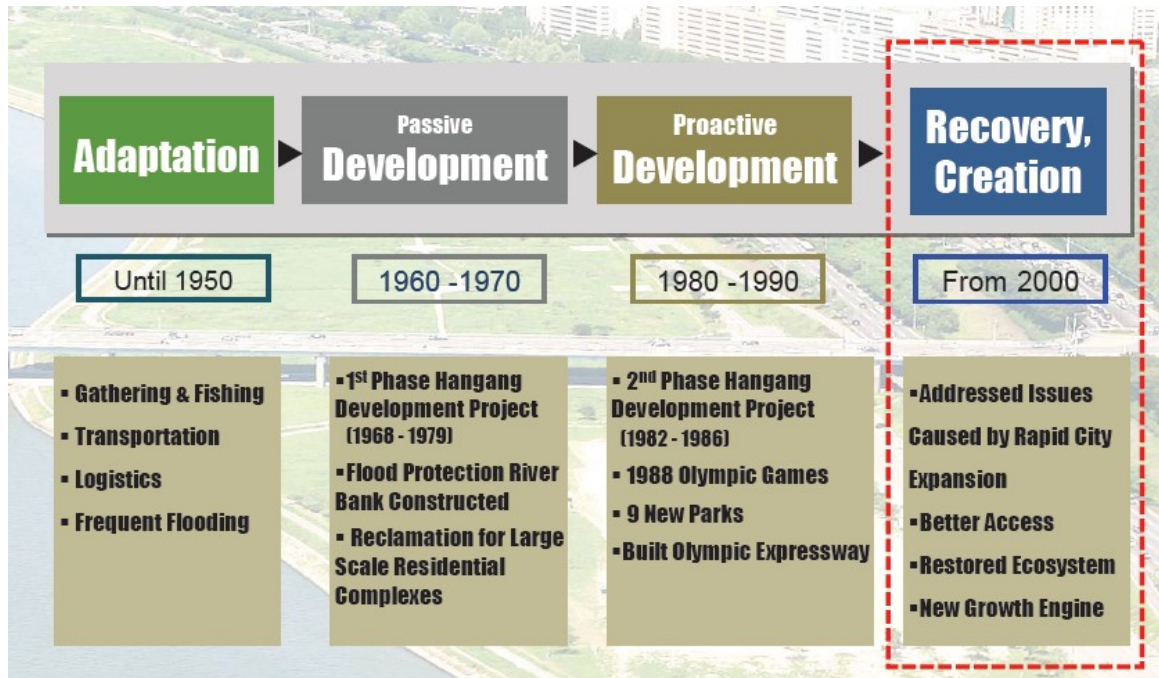


Figure 13 Hangang Management

2.5.2. Restoration, creation and core values



Figure 14 Restoration of river

---

### 2.5.3. Project overview

Project scale- Period: - 2007 - 2030 (20 yr period)

Affected Area: - Hangang within Seoul (Less than 1km from the River)

### 2.5.4. Project characteristics

- Comprehensive Plan-First of Its Kind since the Hangang Development Project
  - Second is to Cover Entire Hangang & Surrounding Area
- Flexible Plan
  - Revise via Communication with Seoul Citizens

### 2.5.5. Restore Nature

- Natural riverbank

Out of 72km concrete covered riverbank, 32km has been restored to its natural state with 40km to follow suit.

Create as natural riverbank allowing citizens to enjoy nature amidst urban setting.



Figure 15 river bank

- More Ecological Parks along the River
  - Completed: 4 Parks

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Under Construction: 4 Parks

Planned: 4 Park

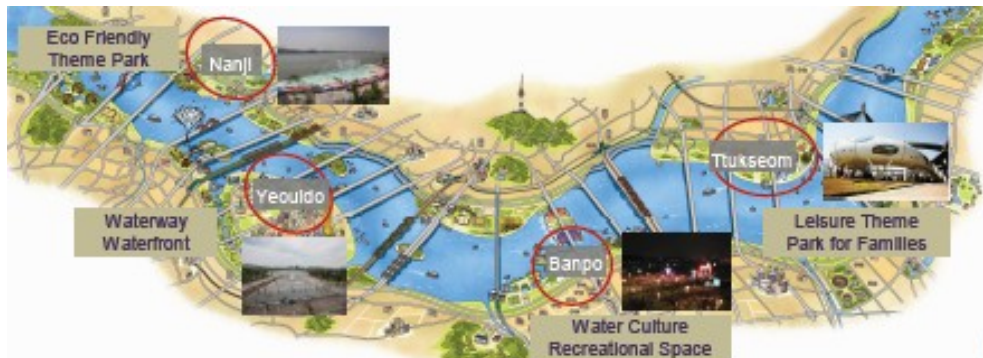


Figure 16 Zoning of parks



Figure 17 zoning of parks



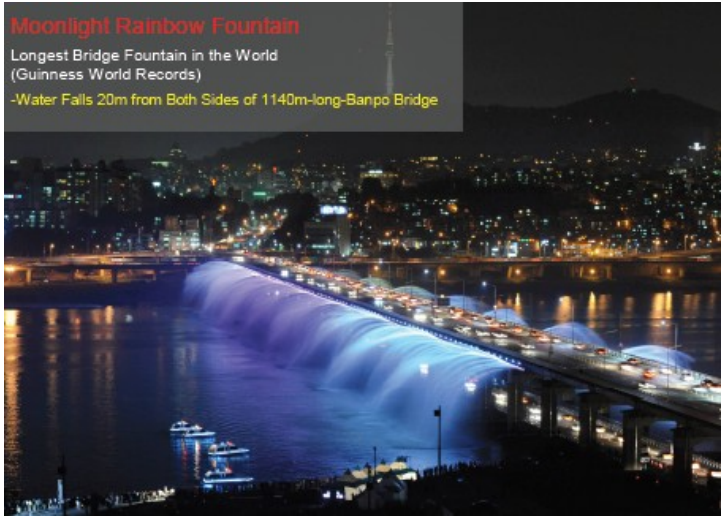


Figure 18 riverfront development



Figure 19 riverfront development



Figure 20 riverfront development



Figure 21 riverfront development

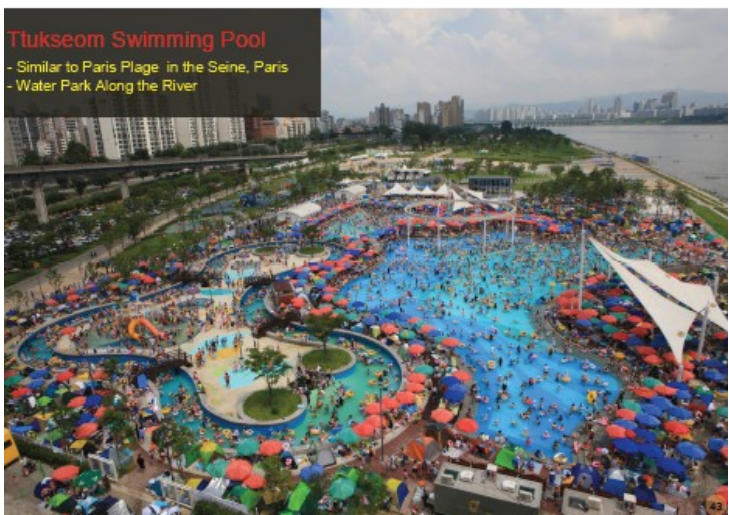


Figure 22 riverfront development



Figure 23 riverfront development





**Figure 24 riverfront development**

- Hangang Park Planting Design  
850,000(2006) – 2 Millions plants

Plants near Promenades, Bike paths, Roads

Provide Places for Peace and quiet within the city



**Figure 25 riverfront development**

### 2.5.6 Better access

- More & Better Footpaths to Hangang Parks

Expanded: 45 (2006)

Better footpath, safer and more convenient

10 Bus stops, 8 elevators, 10 observatories (Cafe)

---

### 3 Footpaths connecting subway stations



Figure 26 riverfront development

#### 2.5.7. Major achievements

- Improved skyline



Figure 27 riverfront development

---

- Ecological changes



Figure 28 ecological changes

(project, Oct 10, 2011)

## 2.6. Inferences

**Table 1 Inferences**

### Riverfront Development

Waterfronts are settlements, cultivation or commercial developments that come up along water bodies like rivers, coastal regions or lakes, acting as lifelines for development of cities. The economic and historical significance of many a city speaks of the glorious waters flowing through it. The waterfronts have the potential to become the cultural and heritage hubs of these cities that lie on the bank of the rivers and attract people from the city and also tourists to spend time.

The development of waterfronts typically include the following activities:  
Boat trips, Swimming/Bathing, Fishing, Boatyards, Theme Parks, Parks, Walking, Water sports, Commercial complex, Hotels, Shops, Residential buildings, Offices

S.No.	Facility	Impact		Solutions	Intent of case study (To be found out)
		Beneficial	Harmful		
1.	Boat trips/Boating (Water)	<ul style="list-style-type: none"> <li>Boats can dramatically enhance the character and experience of a waterfront when it is easily reached in ways other than driving.</li> <li>Can use for recreational purpose.</li> <li>Can use for religious events in rivers.</li> <li>Can use for business purpose.</li> </ul>	<ul style="list-style-type: none"> <li>Small incremental discharges of petroleum products associated with boating contribute 137 million gallons of oil pollution to waterways worldwide every year, according to NOAA, which can add up to significant water quality impacts.</li> <li>Algae and small organisms that live in water bodies can be killed immediately by a fuel oil spill.</li> <li>Even if they should survive the spill, it is possible for the effects to bioaccumulate, harming bigger fish and even people and wildlife that eat them.</li> <li>Spills most often occur during the fueling and maintenance of engines and boats.</li> <li>Trash dumped from boats can be washed up onto the beach, posing a threat to humans and marine species. When boat sewage is not disposed of properly, pollutants and nutrients can enter the water, degrading water quality.</li> <li>Water movement waves cause adverse impact to sediments.</li> </ul>	<ul style="list-style-type: none"> <li>EPA (Environmental protection agency) works with Govt. to regulate the transportation of municipal and commercial waste on vessels and to issue regulations for the manufacture, maintenance, and efficiency of marine sanitation devices (boat toilets), as well as the establishment of "no discharge zones" for vessel sewage.</li> <li>EPA also implements programs to control the direct and indirect discharge of pollutants to beach areas.</li> <li>Laws and regulations prohibit the direct discharge of pollutants (point source pollution) to water bodies.</li> <li>Voluntary programs help prevent the indirect discharge of pollutants (nonpoint source pollution) to water bodies.</li> <li>Design new overwater structures and facilities so that shoreline armoring is not needed.</li> <li>Replace existing hard armoring with a system that reduces impacts.</li> <li>Promote small wooden boats instead of machine boats.</li> </ul>	<ul style="list-style-type: none"> <li>Types of Ferry and boats which has been used into the river.</li> <li>What measures and considerations has been taken.</li> <li>Status of wooden boat in comparison to engine boats.</li> <li>Interaction to local stakeholders of boating.</li> <li>Role of government and authorities into management and water pollution control through boats.</li> </ul>
2.	Walkways (Land)	<ul style="list-style-type: none"> <li>Whether exercising or taking the family for a stroll, riverside offers scenic and invigorating experiences.</li> </ul>	<ul style="list-style-type: none"> <li>Impacts on dunes due to foot traffic can lead to erosion and destruction of vegetation.</li> </ul>	<ul style="list-style-type: none"> <li>Edges of pathways should be defined.</li> </ul>	<ul style="list-style-type: none"> <li>Ghats itself have been used for pedestrian movement so impact of excessive foot traffic per day.</li> </ul>
3.	Surrounding Buildings (Land)	<ul style="list-style-type: none"> <li>Iconic, attention-grabbing buildings that reflect a human scale and do not detract from the surrounding context can be a boon to the waterfront, so long as they serve a useful function.</li> <li>High-rise towers that lack any public uses on the ground floor, usually create a wall that physically and psychologically cuts off the waterfront from surrounding neighborhoods.</li> <li>A nice view of riverfront from the building.</li> </ul>	<ul style="list-style-type: none"> <li>Residential development can be dominated. Because these are places that are full of people, day and night.</li> <li>They are the sites of festivals, markets, fireworks displays, concerts, spontaneous celebrations and other high-energy gatherings. A high concentration of residential development undermines the diversity of waterfront use and creates pressure to prevent night time activity from flourishing.</li> <li>All type of pollution from different sources come into the river.</li> </ul>	<ul style="list-style-type: none"> <li>Design structures so they minimize obstruction of currents and alteration or sediment transport to prevent stagnation and the buildup of waste.</li> <li>Minimize noise during water sport's breeding or migration time.</li> <li>Locate new facilities further from shore in deeper water.</li> <li>Locate structures and activities away from native aquatic vegetation or other sensitive areas.</li> <li>Provide sewage disposal facilities at marinas.</li> <li>Prevent contaminated runoff from entering the water.</li> <li>Keep sites clean of litter.</li> <li>Properly dispose of waste and contaminants.</li> <li>Use best management practices to exclude or eliminate pests, so pesticides are unnecessary.</li> <li>Wash gravel or shell to be used for aquaculture beds in an upland location where the wash water cannot enter the waterbody.</li> <li>For log booming and storage activities, implement practices that prevent bark from rubbing off of the logs in the water.</li> </ul>	<ul style="list-style-type: none"> <li>Marking of all type of land use near Ghats.</li> <li>Identify direct and indirect uses of Ghats.</li> <li>Role and Impact of Ghats on urban growth and the reverse.</li> <li>Waste water management and sewage treatment for urban surrounding and role of authorities.</li> </ul>
4.	Bathing (Water)	<ul style="list-style-type: none"> <li>The most sacred and the basic ritual in Hinduism is taking the bath in the holy water of river Ganga and Yamuna. As it is compulsory for every Hindu to take a dip in Ganga once in a life time.</li> <li>Public bath served as a place to meet and socialize with friends, a gathering place to see into local and city gossip, a place to get an athletic workout.</li> </ul>	<ul style="list-style-type: none"> <li>A kind of re-creational activity to release stress.</li> <li>For religious purpose.</li> </ul>	<ul style="list-style-type: none"> <li>Limit vehicular or foot traffic in shallow water and intertidal (beach) areas to those times needed for operations, and to minimize destruction of a larger area. Use designated routes.</li> </ul>	<ul style="list-style-type: none"> <li>Identifying different uses for bathing on Ghats.</li> <li>Local and tourists.</li> <li>Impact of mass bathing into the river on daily basis, on a day particular.</li> </ul>
5.	Bird watching/Aquatic life (Water)	<ul style="list-style-type: none"> <li>River front provides a unique habitat for a variety of plants and animals.</li> <li>Dune vegetation provides nesting areas for several kinds of birds and animals.</li> <li>The types of species found on a beach are determined by the type of beach, to the hot wet climate of the tropics, mangrove trees dominate estuarine/mangrove beaches in the warmer climate of beaches, are dominated by a few species of hardy grasses and bushes that can withstand strong winds, cold winters, and intense summer heat.</li> <li>A kind of re-creational activity to feel the nature.</li> </ul>	<ul style="list-style-type: none"> <li>Excessive interference in their habitat can force them to migrate.</li> </ul>	<ul style="list-style-type: none"> <li>Place structures and activities in deeper water beyond where aquatic vegetation can grow, or design them so they can not "ground out" or strike the floor of the water body.</li> </ul>	<ul style="list-style-type: none"> <li>Identification of flora and fauna of surrounding area and river.</li> <li>All efforts which has been taken to protect aquatic life.</li> <li>List of activities which affected aquatic life.</li> </ul>
6.	Washing (Water)	<ul style="list-style-type: none"> <li>Another daily scene is the washing of clothes in the holy Ganga river.</li> <li>Used by localities and Dhokees.</li> <li>Providing job to hundreds of people.</li> </ul>	<ul style="list-style-type: none"> <li>We can't comprehend washing clothes in water other than the clothes themselves.</li> <li>Detergents that contain phosphates are highly caustic and toxic.</li> <li>It can have poisonous effects in all types of aquatic life, destroy the external mucus layers that protect the fish from bacteria and parasites, plus they can cause severe damage to the gills.</li> <li>They lower the surface tension of the water and organic chemicals such as pesticides and phenols are then much more easily absorbed by the fish. A detergent concentration of only 2 ppm can cause fish to absorb double the amount of chemicals they would normally absorb.</li> <li>Most fish will die when detergent concentrations approach 15 parts per million. Detergent concentrations as low as 5 ppm will kill fish eggs.</li> </ul>	<ul style="list-style-type: none"> <li>Modernizing the Dhobi ghats was carried out with latest technology &amp; advanced machinery to avoid all the health hazards, environment pollution &amp; to improve the quality of wash, it quality of washment. It also achieves high productivity &amp; profitability in all seasons. The also facilitates washermen to come forward &amp; achieve progress in their profession.</li> <li>Locate washermen to come forward &amp; achieve progress in their profession.</li> <li>Locate washermen to come forward &amp; achieve progress in their profession.</li> <li>If the whole community will participate washing will be in bulk. Cost effective with quality of wash in separate locations.</li> <li>Use of latest technology and modern washing equipment to overcome from the old and hazardous washing methods still being followed by washer men.</li> <li>Use eco-friendly chemicals.</li> <li>Separate wet and dry areas for operation.</li> <li>Human contact with effluent water is ruled out.</li> </ul>	<ul style="list-style-type: none"> <li>Identification of different professional and common users for washing.</li> <li>What all solutions govt. has made to stop professionals.</li> </ul>
7.	Rituals/Worshipping (Water/Land)	<ul style="list-style-type: none"> <li>in riverfront after bathing on Ghats prayers are offered to the one or more deities along the ghat which usually consists of the male and female. The temple priest give the food as Prasad to the devotee who visit the temple, it is blessing from the God.</li> <li>For every occasion there are separate rituals and ceremonies.</li> <li>From the ritual bath to Havan, Yagna and Puja there are various rituals which are performed by the individuals as well as in groups.</li> <li>These rituals are well associated with the fairs and festivals.</li> <li>The other important ritual of the Ganga ghats is Aarti. The aarti is a Hindu ritual in which light from the wicks soaked in purified butter is offered to deities.</li> <li>Mundan is a ceremony of removing the hair. The ritual is performed by the male members of the family to achieve the purity after any member in the family passes away and usually is done after bathing in the river Ganga.</li> </ul>	<ul style="list-style-type: none"> <li>Remain items and flowers of puja also dumped into the river as they also considered sacred.</li> <li>Utensils of puja samagri also washed in river to purify it.</li> <li>All the remains of several activities like Mundan, coronation etc also dumped into the river.</li> </ul>	<ul style="list-style-type: none"> <li>It is the biggest problem of Ghats and till now Thousands of crore rupees invested in several cleaning and revival projects of Ganga river.</li> <li>It is the responsibility of Local municipality and authorities of district, to clean the river as well as surroundings garbage and waste on daily basis.</li> <li>Several cleaning campaign have been organized for awareness.</li> </ul>	<ul style="list-style-type: none"> <li>Types of rituals celebrated at Annulari basin, and on daily basis and their impact.</li> <li>List of different stakeholders related to rituals.</li> <li>List of different stakeholders related to rituals.</li> <li>List of different stakeholders related to rituals.</li> <li>Role of authorities on this pilgrimage route system.</li> </ul>
8.	Swimming (Water)	<ul style="list-style-type: none"> <li>Good for health and also for recreational purpose.</li> <li>Source of public interaction.</li> </ul>	<ul style="list-style-type: none"> <li>Swimming in sewage-contaminated sea water can cause a range of diseases from gastrointestinal (digestive tract) and respiratory infections to ear, nose and throat complaints.</li> <li>Chemical composition can change due to excessive use.</li> </ul>	<ul style="list-style-type: none"> <li>Beach Water Quality</li> <li>In order to ensure a safe swimming experience for users, bacteria tolerance standards follow a combination of the EPA (Minnesota Pollution Control Agency) and US EPA (United States Environmental Protection Agency) standard for primary body contact water. If a single sample exceeds 1200 colonies per 100 ml or the geometric mean of the last 5 weekly samples exceeds 126 colonies per 100 ml, the beach will be closed.</li> <li>ACQU will be taken to identify and eliminate the bacteria source in either case before the beach is reopened.</li> <li>Water must be safe to swallow, so that it does not damage human skin, but often has a positive effect. The water must have a pH of around 7.8 degrees, but not bigger than 8. This is not only good for the skin, but it also prevents the development and life of certain bacteria in the water.</li> </ul>	<ul style="list-style-type: none"> <li>Identification of recreational areas in surrounding.</li> </ul>
9.	Pathway(Paved) (Land)	<ul style="list-style-type: none"> <li>These trails tend to be flat with many surface pollutants forcing the water to run off paved surfaces directly into nearby storm drains and then into streams and lakes.</li> </ul>	<ul style="list-style-type: none"> <li>Normal pavement is an impervious surface that sheds rainfall and creates surface pollutants forcing the water to run off paved surfaces directly into nearby storm drains and then into streams and lakes.</li> </ul>	<ul style="list-style-type: none"> <li>Paved trails are great resources for youngsters learning to ride or novices who want to avoid riding alongside traffic. Keep in mind that the trails cross many residential streets, so always stop and look for cars before proceeding.</li> <li>Some sections of the trails may have minor ruts or small sections of gravel, which could be challenging to those on roller blades or bicycles.</li> <li>Permeable pavement allows absorption or infiltration of stormwater through the surface into the soil below where the water is naturally filtered and pollutants are removed.</li> </ul>	<ul style="list-style-type: none"> <li>Network of approach roads and its relation to urban surroundings.</li> <li>Availability of parking facilities for users and where/and how it is connecting to Ghats?</li> <li>Uses of pathways besides pedestrian movement.</li> </ul>



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## CHAPTER 3

### 3.0. Case study: Varanasi- City of Temples and Ghats

#### 3.1. Why Varanasi?

- Beliefs about cosmogony, cycle of life and death, purity and pollution, sacred and profane, are tied and enacted in numerous life cycle and death rituals. How it came to possible in Varanasi, which is lacking in Kanpur.
- The Ghat landscape has evolved to support the ritual enactments and is reminding us of mythic narratives in its built form. Thus the tangible and intangible forms of heritage are inextricably bound. Kanpur is also very rich in cultural heritage and religious believes but missing the connection between tangible and intangible.
- The body of the pilgrim and the tourist is fully immersed in the cultural landscape of the Ghats. Being there is a rich, stimulating experience, a total engagement of the proximate senses, whether in Kanpur this relation is totally lost.

#### 3.2. Intent of Case Study

To study cultural landscape of Varanasi Ghats, that integrate natural and cultural heritage and sustains tangible and intangible heritage.

#### 3.3. Introduction

Varanasi distt. is located just 50 -60 km. Away from Vindhyan ranges, which forms southern limit of the Gangetic plain. It comprises of Central alluvial plain.



Figure 29 Location map of Varanasi

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Varanasi map of 1828 AD. And 1924 AD respectively-

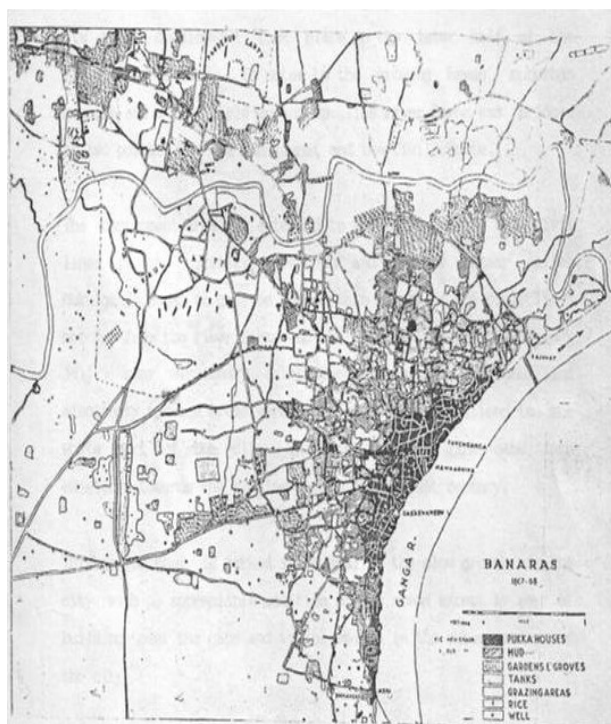
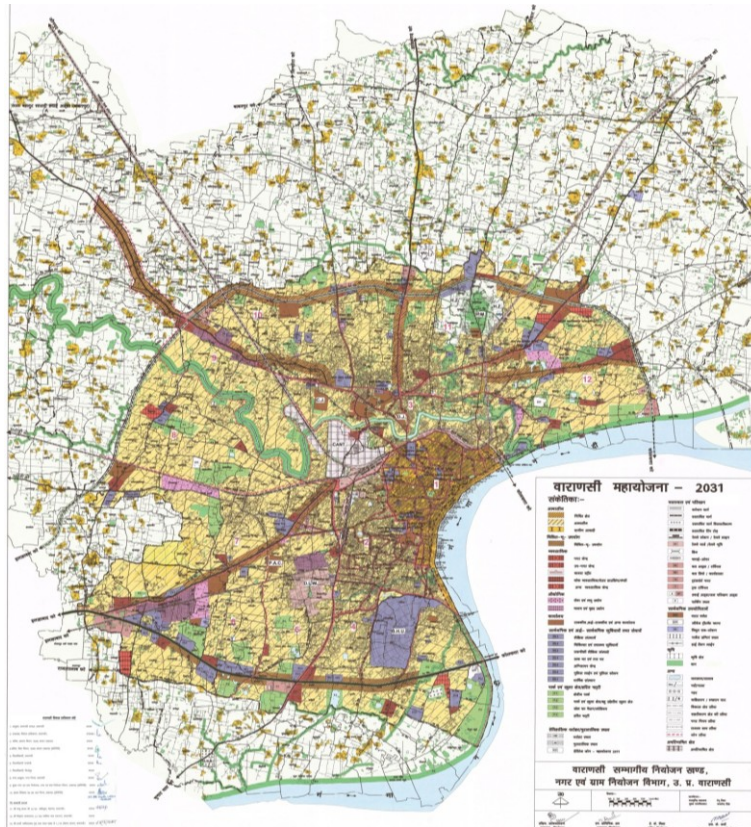


Figure 30 Varanasi map

(Anon., n.d.)





**Figure 31** Varanasi map of 2015 AD

The river flow in a crescent shape meander from south to north (length 6.5km). This shape symbolically described as crescent moon on the forehead of Lord Shiva which is the result of fluvial process through which the coarser sediments get deposited on its western bank between Raj Ghat in the north and Samne Ghat in the south.

The portion between these two points a hillock-like geologic feature, called natural levée, consists of nearly 60m bed of clay with coarse grained sand, limestone concretion (*kankar*) and gravel.

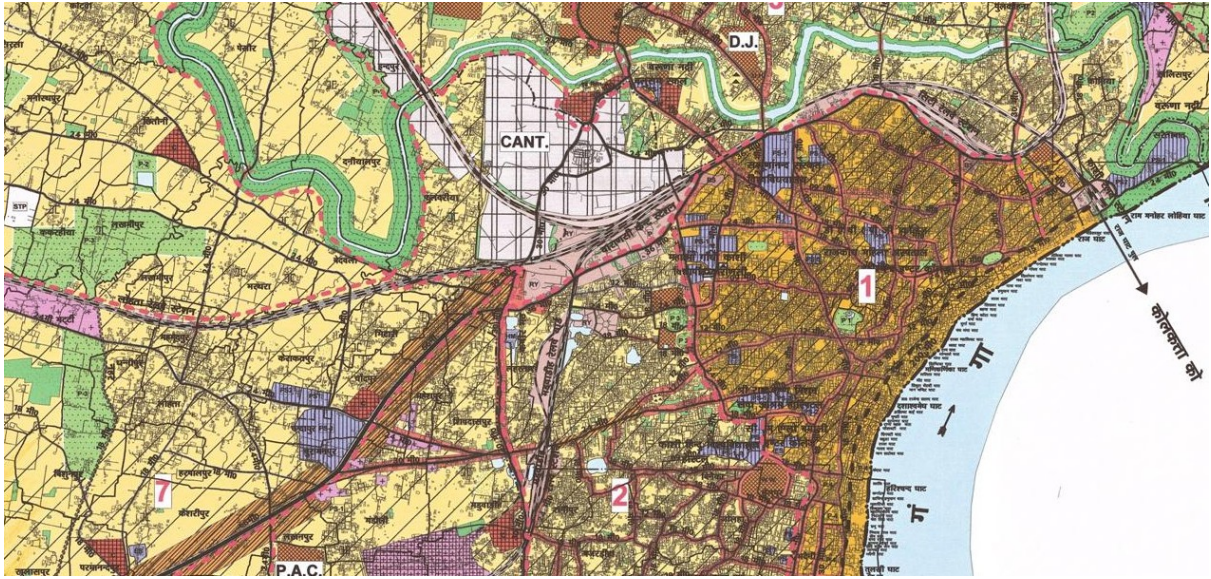


Figure 32 Varanasi river front

### 3.4. VARANASI DEMOGRAPHICS

#### CITY PROFILE

Area- 16500 Hectares

Population- 12.74 Lac ( 2001)

Density - 77.21 Person/Hect

(Anon., 2001-2011)

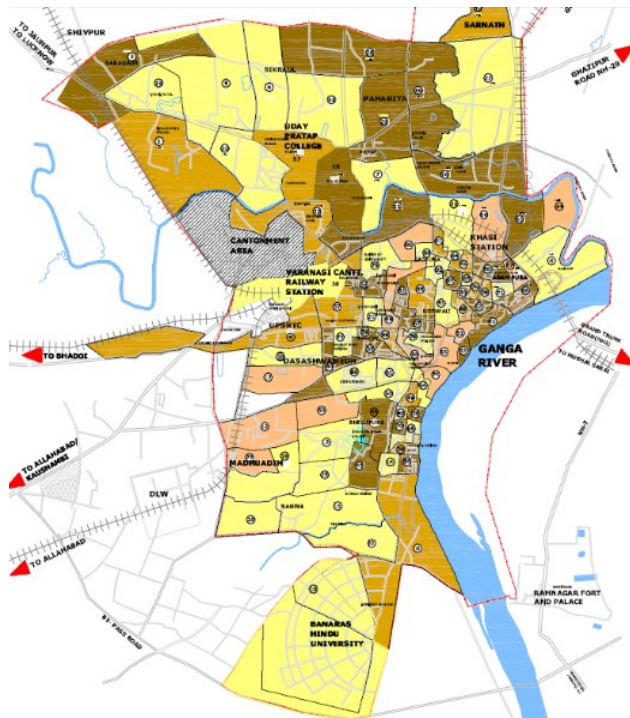


Figure 33 Varanasi Demographic Map

Density Map (People/Area)

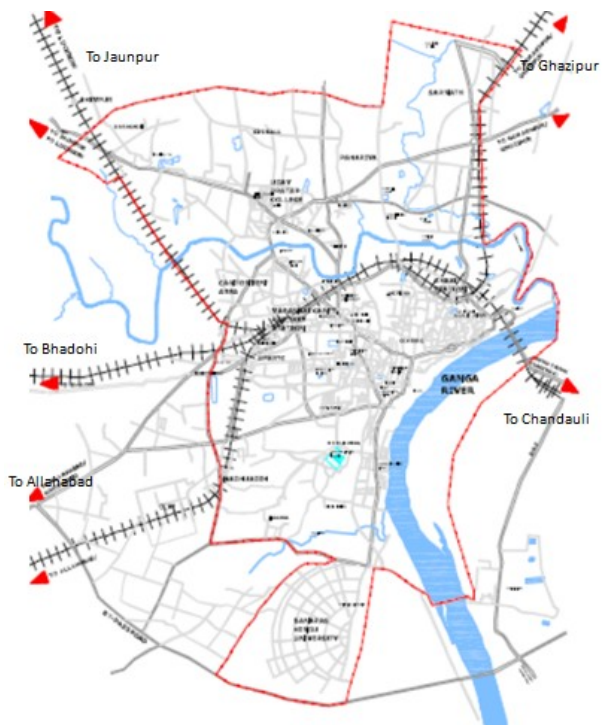
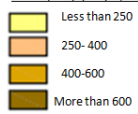


Figure 34 Road network



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### 3.5. History

The ancient city of Varanasi was not built in a day. The city has two remnants of a holy past: the first being Rajghat plateau, where the archaeological findings of wares date back to the period of very existence of urban settlement and the second being Sarnath, where Buddha gave his first sermon in 528 BC. Such a physical landscape induced the origin and growth of a multi-nuclei urban settlement to start with, as clearings amidst the forests which later afforded their names to different mohallas. In fact, the sages and thinkers first established their retreats in the forests and became engaged in their scholastic pursuits along with their disciples.

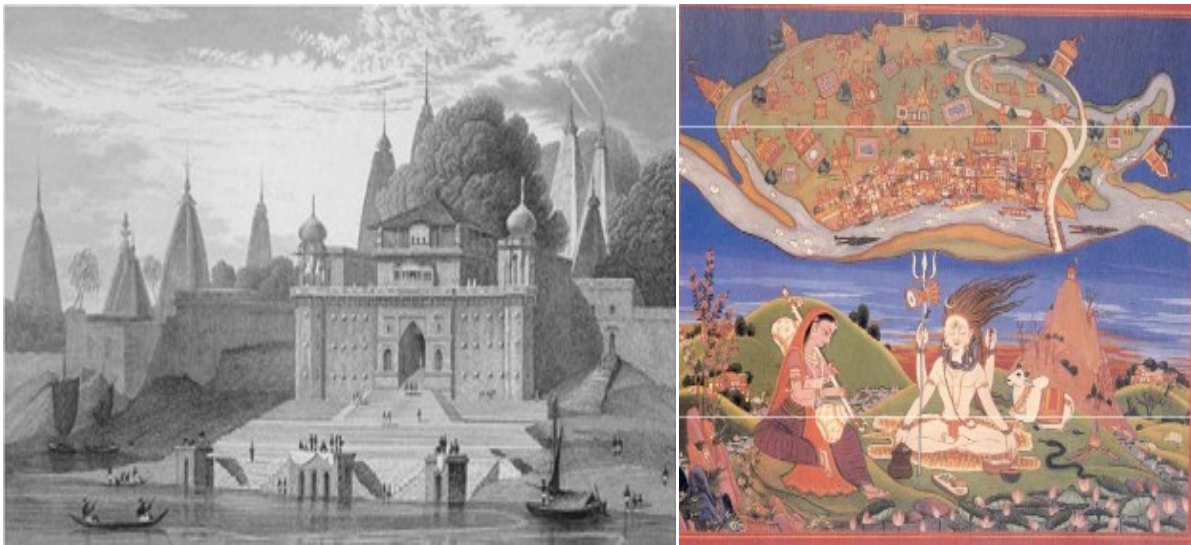


Figure 35 Ancient Varanasi

- Ancient Varanasi having gardens and forest in paintings
- Mythic Landscape of Varanasi

Varanasi traces its origin to Anandvana; the forest of bliss where Lord Shiva sits in a yogic posture with his eyes closed listening intently to his wife Parvati playing the veena. He catches the sacred Ganga in his locks as she pours down from heaven as a result of sage Bhagirath's penance to revive the sixty thousand sons of King Sagara. She purifies and sanctifies, washing away physical dirt and moral sins. (Department of Landscape architecture, n.d.)

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### 3.5.1 Historical Timeline

- 2<sup>nd</sup> Century BC: Traditional core of the city is established.
- 10-11<sup>th</sup> Century AD: Period of golden age.
- 12<sup>th</sup> Century AD: City is brought under Hindu and Muslim rule.
- 13<sup>th</sup> Century AD: City is brought under rule of Muslim Nawabs.
- 1858 AD: The traditional core is brought under Akbar's Mughal Empire.
- 1725 AD: The Kashiraj dynasty establishes Ramnagar.
- 1775 AD: British gained political control over city.
- 1794 AD: The cantonment is established.
- 1862 AD: The first railway link between Kolkata and Banaras is established.
- 1916 AD: BHU established.
- 1950 AD: The first master plan for the city was prepared.
- 1974 AD: Varanasi development authority was formed.
- 1991 AD: "Draft Master Plan 2001" was prepared. (Anon., n.d.)

### 3.5.2. HISTORY OF THE RIVER FRONT

- Ancient Kashi is the oldest continuously inhabited city as a cultural and religious site. However, the city is mentioned in various ancient texts since 800 B.C.
- The palaces and Ghats, that form today the riverfront of Benares, were built in more recent times. Most were built, in the 18th and 19th century, when the city began to be reconstructed.

- 
- A renewed economic and political stability (after 400 years of Muslim rule) led to the construction of eminent residences and religious complexes. Rich personalities came from all over India and beyond, to build temples, palaces and shelters that would welcome pilgrims. These numerous palaces, constructed between the rivulet Assi in the south and the river Varuna in the north.
  - only 14 Ghats are more than 350 years old. Kedar, dashashwamedh, manas sarovar, chaushatti yogini, agnishwar, mangala gauri, bindu madhav, durga, brahma, trilochan, ram and adi keshav.

### 3.5.2. TECHNIQUES OF CONSTRUCTION

These structures rested on piles of brick masonry, a tradition probably brought to India by the Mughals and used for the foundations of the *Ghats and* palaces of Benares.



Figure 36 Ghats of Varanasi

(Jalalis, 2011)

Ghats at Banaras.



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### 3.6 TYPOLOGIES OF THE CITY

On observation of the architectural form of the city, it can be divided into a number of typologies .These are as follows:

- The urban band that developed along the river from Assi in south to Raj Ghat in the north and is composed of river facing buildings (mainly palaces) and Ghats.
- The distinctive urban fabric flanking the river-front urban band and developing westwards from it. Known as the Pakka Mahal, it consists of a web of mohallas, intricately weaved together.



Figure 37 Map of Varanasi

- The gardens and pleasure residences of the rich merchants on the lines of the Mughal gardens, situated on the outskirts of the 18th century city.

- The recent plotted development extending from the outskirts of the 18th century city to the cantonment. (INTACH, June 2010)

## SPATIAL CHARACTERISTICS OF THE TRADITIONAL CORE

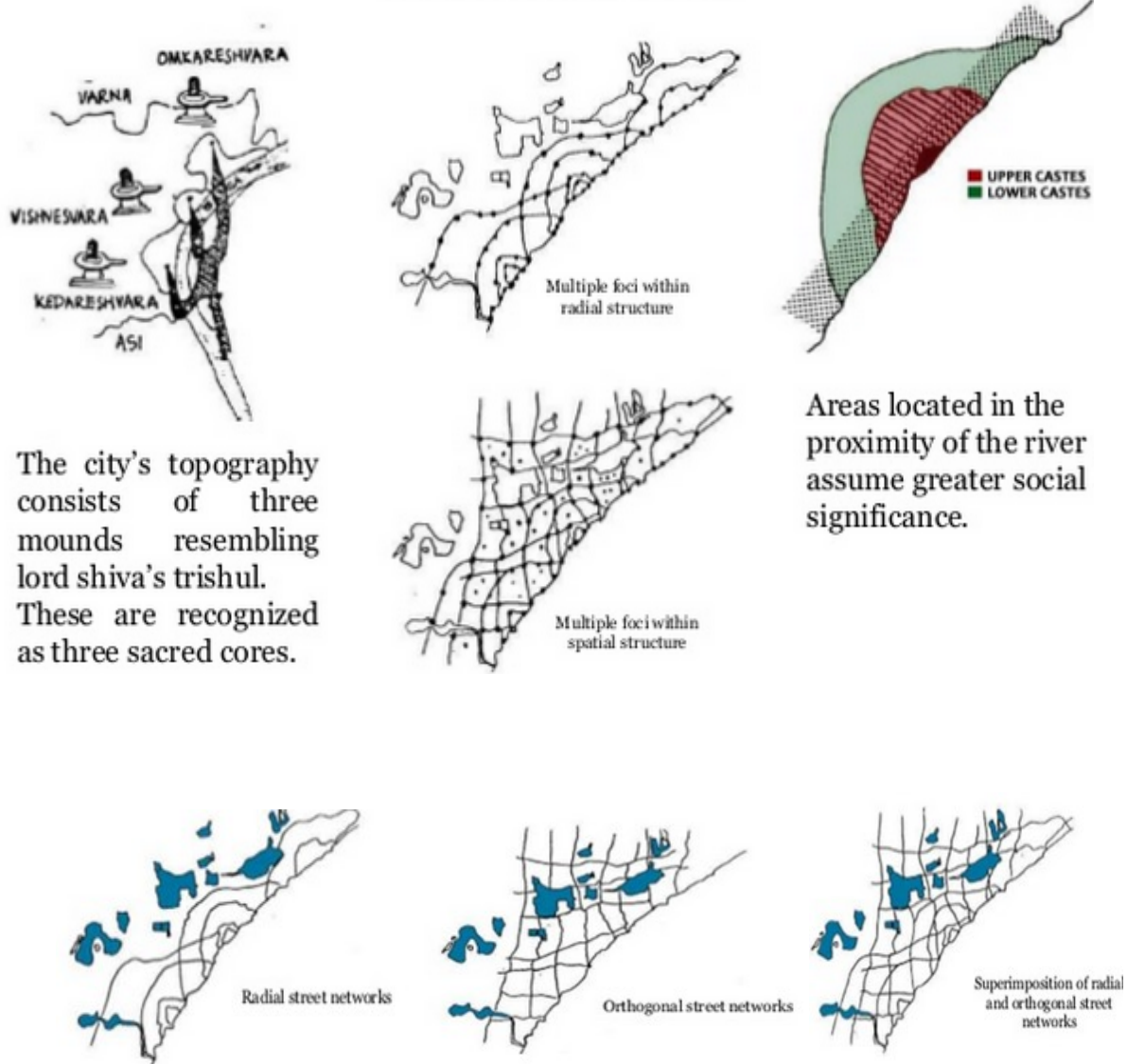


Figure 38 Growth pattern of city

- The palaces and Ghats of Benares have been constructed on this high ridge further consolidating the banks.
- They are mainly designed in relation to the river water and are thus very different from the rest of the buildings found in the city.

- 
- This river front seems to be constructed independent to the city that spreads out behind.
  - In Prinsep's map of 1828, the level of land on the other side of the ridge slopes down slightly and a series of ponds and tanks are found all along the ridge.
  - Initially, these tanks were supposed to collect the drainage and direct it either through the Varuna river or through the Godaulia nala into the river Ganges. However, with the densification of the city, most of these ponds and nalas have been filled up.



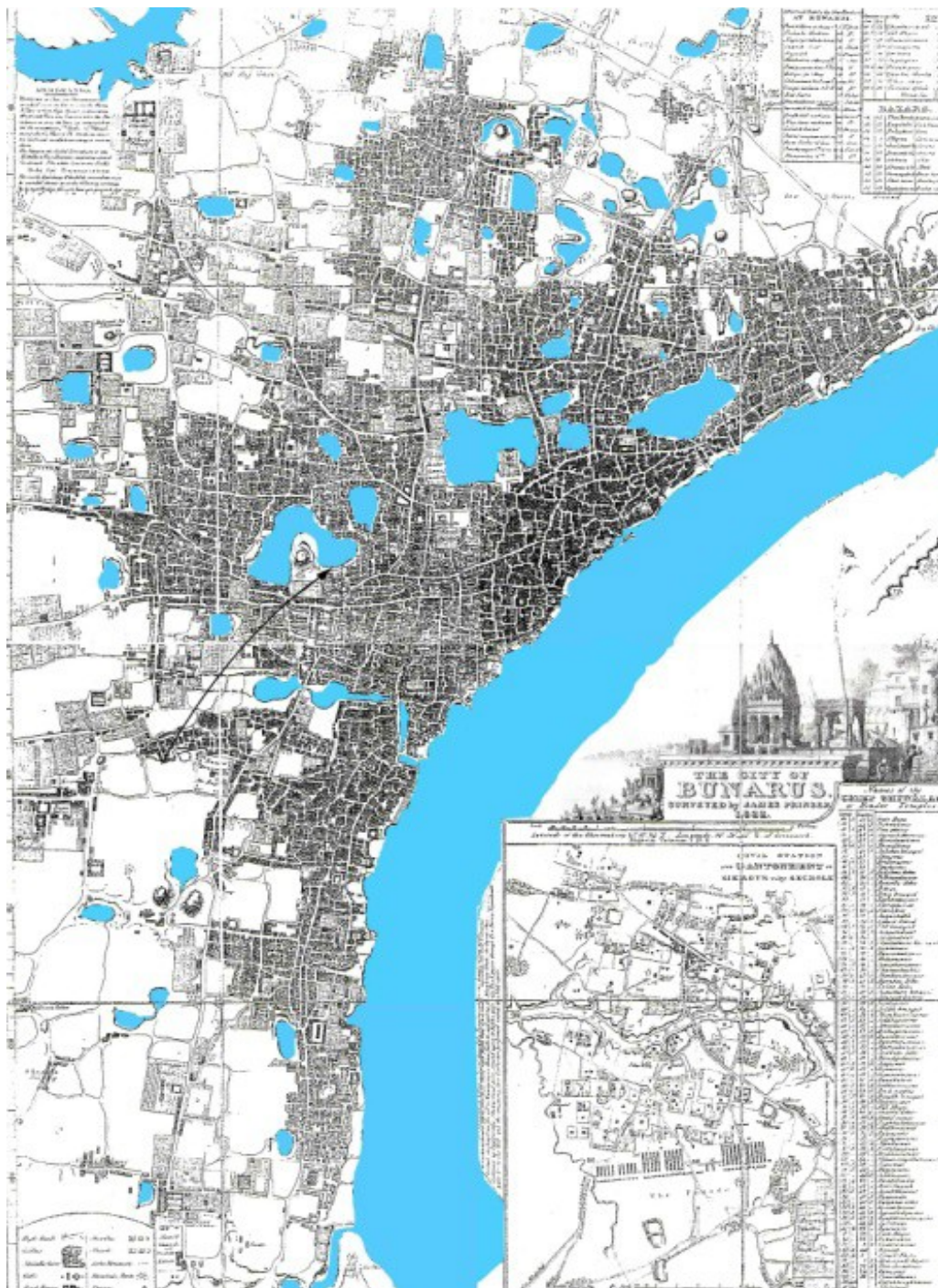


Figure 39 Prinsep's map of 1828

- Before 18th century Varanasi had an extensive system of underground drains meant primarily for carrying rain-water. Those were unsuitable for the flow of sewage as they were rectangular in shape with irregular gradients, ran at varying levels down the centre of the paved lanes, connected with courtyards of houses.

- They later played a role in the laying and development of a new sewer at their old site (Jalalis, 2011)

### 3.7. Drainage pattern

An entire sewerage system was introduced in the city only in 1891 and completed by 1917. This must have been the time when most of the tanks and *nalas* were filled up, either for construction of buildings or for establishing new roads. With time this sewage system installed became inadequate with the quickly expanding city.

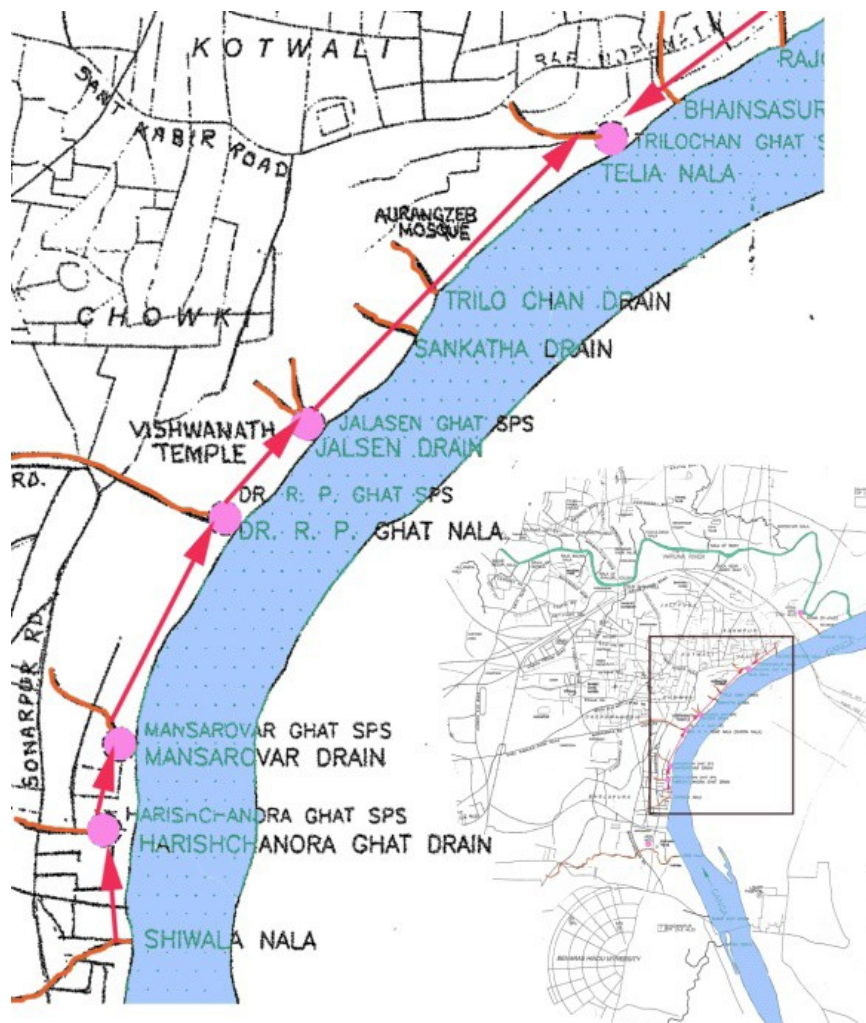


Figure 40 Drainage map



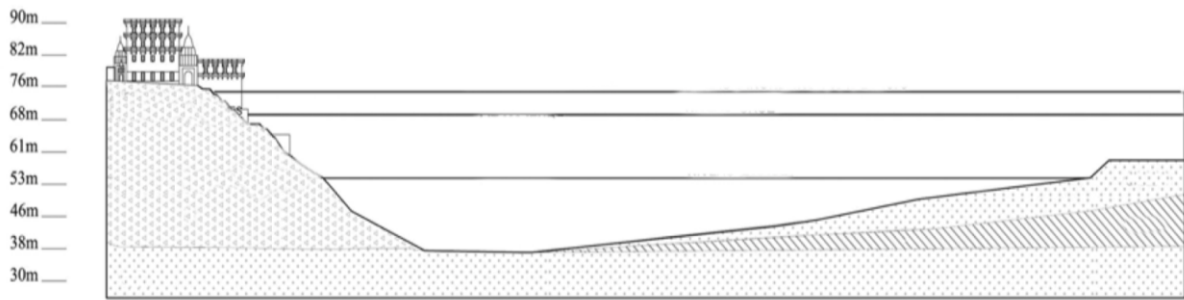


Figure 41 River profile

The highest flood level of river Ganga was 73.90m (1978) and the lowest river water level is approximately 58m. It is at an elevation of 80.71 metres above mean sea level. (Jalalis, 2011)

### 3.8. Dashashwamedha Ghat- (Detail study)

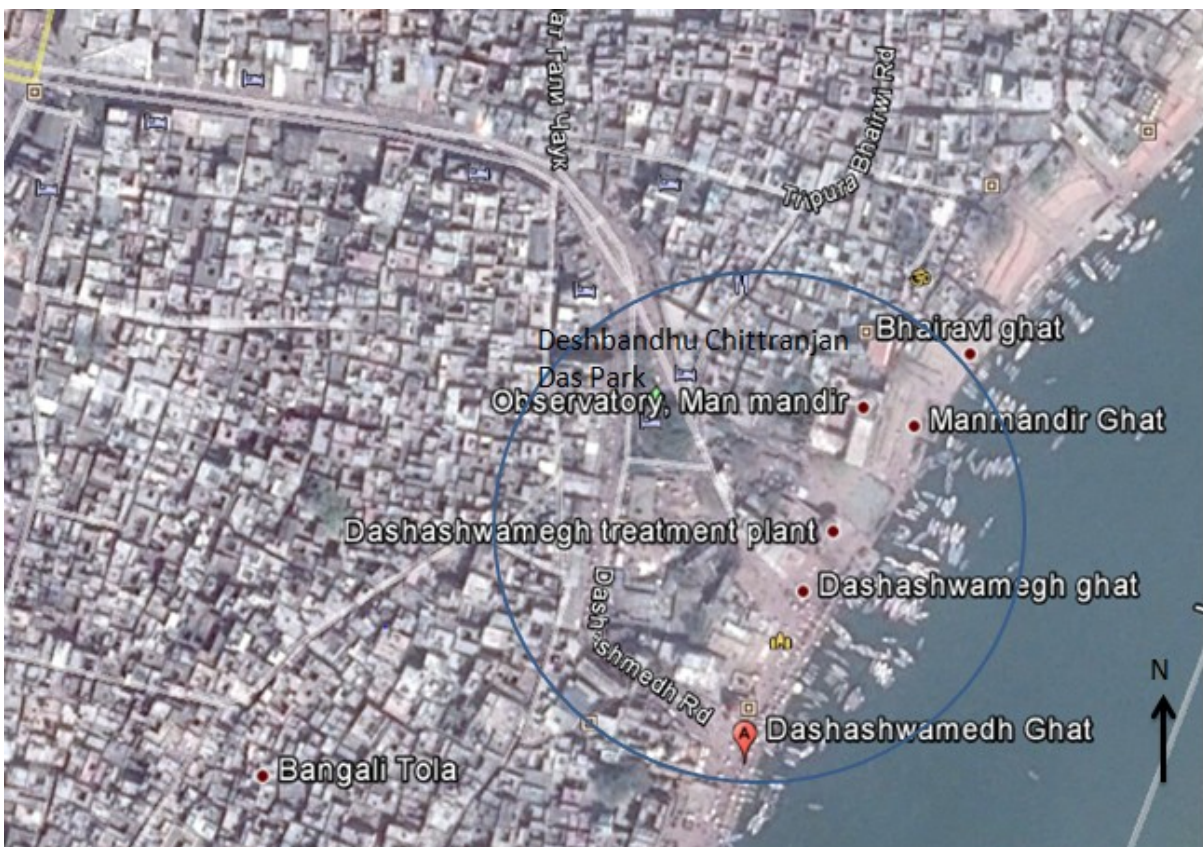


Figure 42 Dashashwamedha Ghat

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### 3.8.1 Background

It is located close to Vishwanath temple ,and probably the the most spectacular Ghat. A group of priests daily perform “Agni pooja”, in the evening at this Ghat. It provides a beautiful and colorful riverfront view. Thousands of earthen lamps are immersed in the waters of holy Ganges and the floating lamps give a divine look to the river at dusk.

Today in that area there lies an incomplete commercial complex and the area is used for parking of bicycles. There is a vegetable market and it has now taken the place on the road which is creating more congestion. At one point of time the area supported the Ghat activities during monsoon. Hotels, lodge and dharamshalas occupy the front of the river stretch. The skyline of the Ghat area has drastically changed. Sewerage pumping stations have also come up. Godavari stream was filled up and now acts as the main approach road to Dasashwamedh Ghat, which is one of the reasons of popularity of the Ghat.

### 3.8.2. Observation sketches-



Figure 43 View of Ghat





Figure 44 View of Ghat



Figure 45 View of Ghat

### 3.8.3 Images of Ghat at different ages-



Figure 46 Dashashwamedh Ghat, 1883 (Photographer - Prasad Babu Jageswar)



Figure 47 Dashashwamedh Ghat, 2015

#### 3.8.4. HIERARCHY OF STREETS

The streets have a hierarchy of movement pattern with the ones leading to the Ghats and the main vehicular street being the most important ones with the maximum



pedestrian traffic. The streets are therefore of varying widths , the most important ones being the widest and straight and the less important ones being for lesser width and more zig-zag nature.



1 M



3 M



OPEN



5 M

Figure 48 hierarchy of streets



### 3.8.5. Detail analysis of streets and open space network

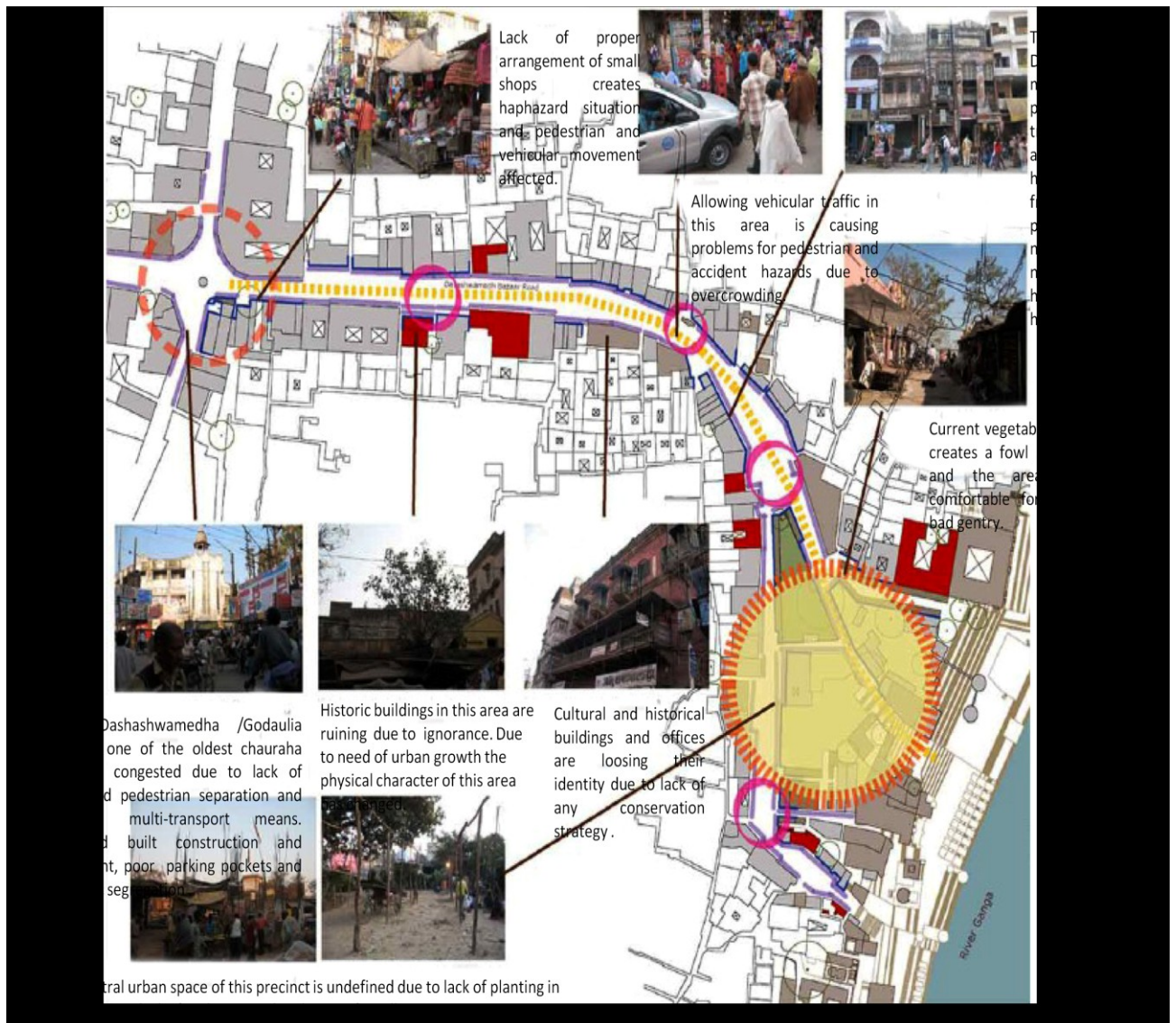


Figure 49 Detail analysis of Ghat

(INTACH, June 2010)

### 3.8.6. View shed analysis

Panoramic views of the Ghats are obtained along the length of the Ganga Riverfront and the river itself is a magnificent view. It is difficult for visitors to see the entire stretch of the river from the Ghats as they are stages for ritual activities and crowded with buildings.



**Figure 50 Viewshed analysis**

Building structures on the Ghats become viewing points for observers. Finding spaces to frame the view will enable visitors to appreciate the magnificence of this holy landscape. Boat travel is the best way for visitors to understand the entire ghat landscape. The east bank of the Ganga with panoramic views of the river and the Ghats contrasts with the liveliness of the built-up west bank.

#### 3.8.7. Haptic and Kinesthetic experiences in the streets –

The architectonic structure of the city and its spatial volumes create haptic and kinesthetic experiences.

- The Kinesthetic experience in moving from the main road to Dashashwamedh Ghat is depicted in a series of spatial sequences. The haptic experience in the narrow alley is that of darkness and enclosure.
- Details such as texture of the wall, goods on the stalls, shrines along the road, clothes hanging near windows and many others can be viscerally felt.
- The movement from the building interior to the Ghats entails the transition from feelings of enclosure to expansiveness as the river comes into view. (Department of Landscape architecture, n.d.)





Figure 51 Streets

- Movement on and along the Ghats is through a labyrinth of walls, people, and livestock.



Figure 52 streets



Figure 53 Streets

- Tanks are constructed so they are also below the street.
- Most alleys appear as a leftover space between the buildings and give a strong sense of enclosure.
- An automobile cannot enter alleys close to the Ghats. If the street is wide enough for motorcycles, livestock, and pedestrians, all three will probably inhabit it. (Goswami, n.d.)



Figure 54 streets





Plate 1 Food





Plate 2 Foods and sweets

- Upon reaching the water's edge, the sense of relief erases the memory of confusion and claustrophobia that the streets had left. The river is the destination for many Varanasi dwellers in daily life and also in death.



Hustle bustle of Dashashwamedha Ghat chowk

Figure 55 Approach road

- Colour, textures, spires, fenestration, steps, platforms, vegetation, boats, among other elements, are repeated at irregular intervals and form the unifying element in a very complex visual structure.

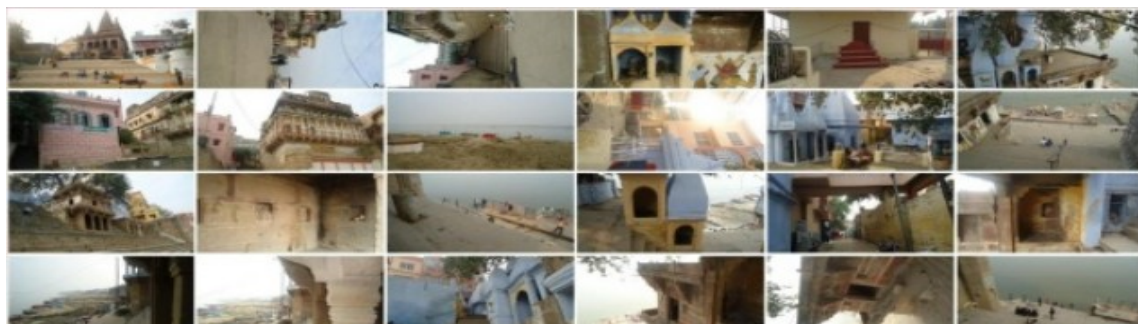


Figure 56 Elements of Ghat



### 3.8.8. Activities on Ghat

Ghats are series of steps leading down to a water body. Derived from the Sanskrit word Ghatta, meaning a landing place or step by a riverside. Most Ghat platforms are Octagonal and either built of solid stone or least stone clad. The steps are remarkably versatile constructions adapting to highly variable water levels, as well as to sacred and profane functions.

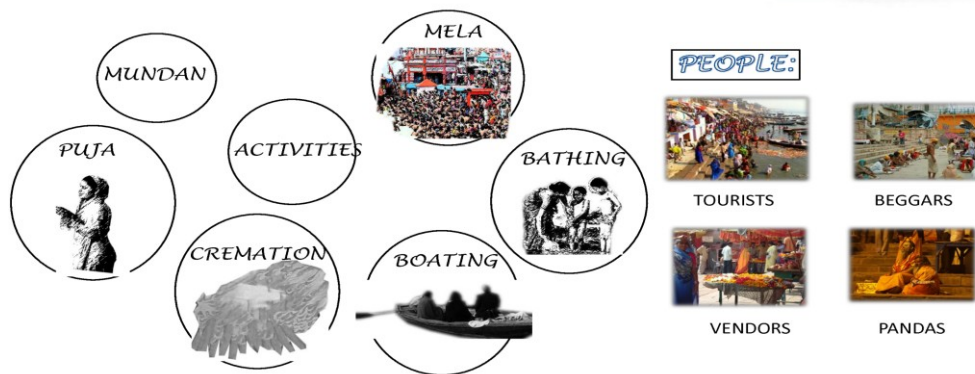


Figure 57 Activities on Ghat





Plate 3 Activities on Ghat





Plate 4 Activities on Ghat





Plate 5 Activities on Ghat





Plate 6 Activities on Ghat





Figure 58 Bathing

The collages capture each kind of sensual experience-- aarti and pooja are stronger in acoustic stimulation while flowers, burning incense, and smoke have the strongest impression of olfactory sensation. Bathing in the Ganga, eating food, the presence of fire and water, and the breeze felt in flying kites are rich tactile stimulations.



Figure 59 Rituals





Figure 60 Rituals

**Boat rides** are very popular, especially at sunrise and sunset. The most popular sunset ride is to start at Dashaswamedha Ghat and head up to Manikarnika Ghat to see the cremations in progress, and then return to Dashaswamedha and watch the evening aarti from the boat.

Sunrise is another magical time for a ride, when the Ghats are filled with Hindus bathing and starting their day - one of the most famous sights in India. You can bargain the price down to around Rs 50/person per hour, but expect to be quoted much higher — the current bargained down 'foreign tourist' rate for a boat ride is Rs 300! In fact there is a price limit set by the city in 1998 but still in force today that sets a price range from Rs 50 for boats up to four seats to a maximum of 125 for very large boats. (That's per hour and boat not per person.)

### 3.8.9. Rituals on Ghats-



Figure 61 Rituals

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## Yagya and Mundan Sanskar



Figure 62 Rituals

Pooja and Ghat umbrella

(INTACH, june 2010)

### 3.8.10. Sections of Ghats

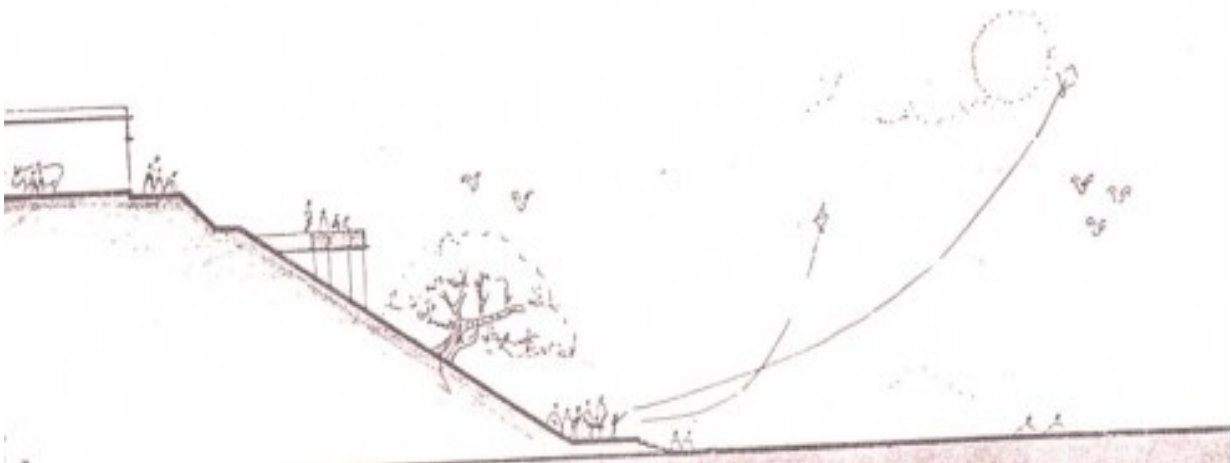


Figure 63 Section

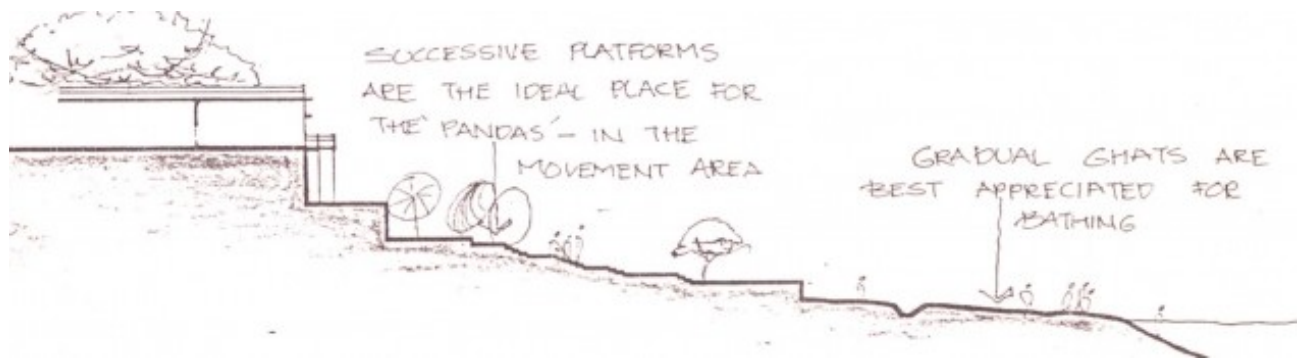


Figure 64 Section

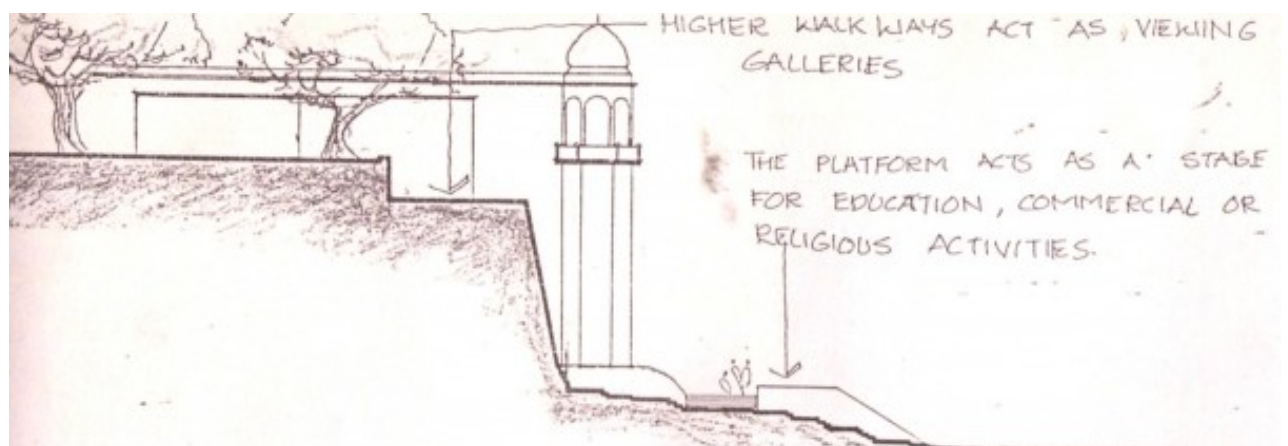


Figure 65 Section

(Jalalis, 2011)



### 3.8.11. Cycle of festivals on the Ghats

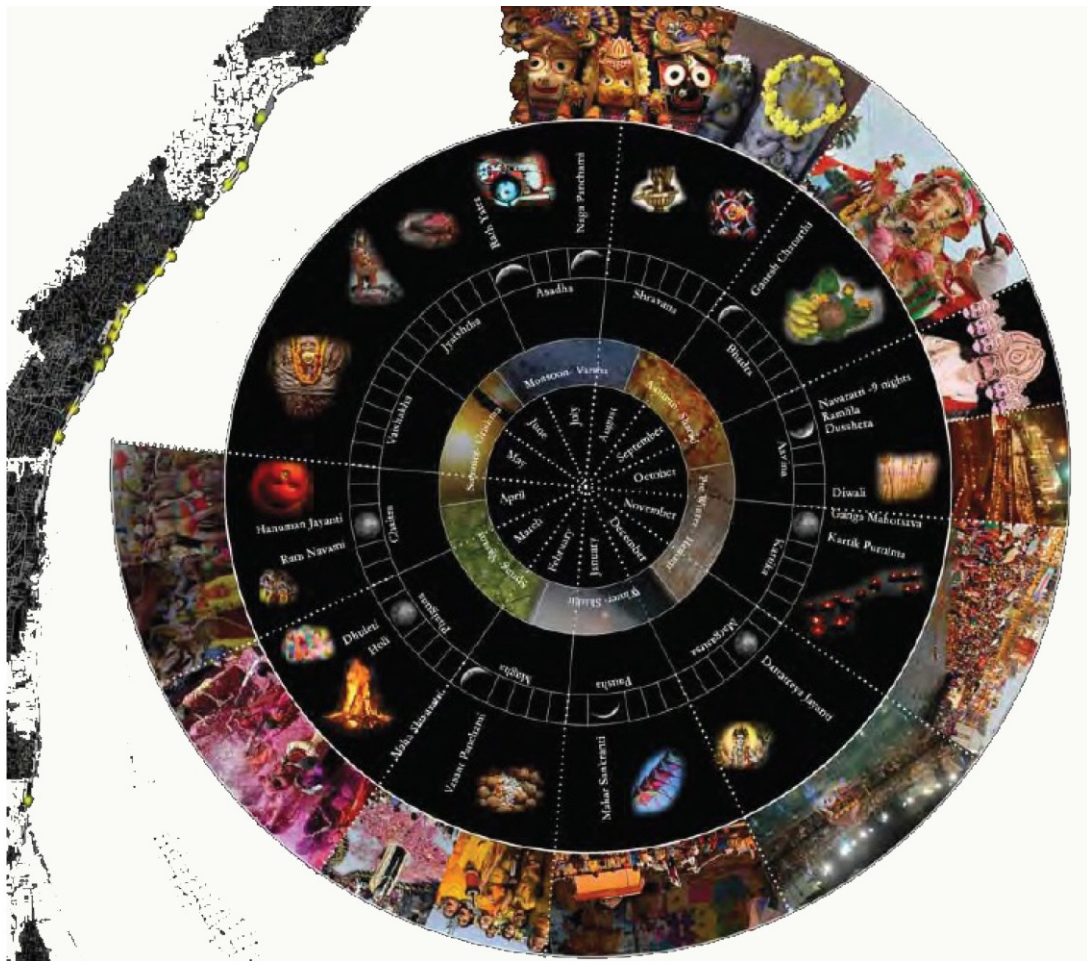


Figure 66 Types of festivals

(University of Illinois at Urbana Champaign, n.d.)

### 3.8.12 ISSUES

- There are an immense pressures from tourism, economic development and population pressures which are now threatening the unity and integrity of the cultural landscape and atmosphere, and the urban skyline of the Ghat area.
- This increasing population is over burdening the carrying capacity of the urban environment and the river ecosystem and unplanned mass tourism could potentially have a hard impact on the cultural carrying capacity of the old city centre.

- 
- Social hygiene and sanitation methods too are beginning to bend under the pressure of a growing resident population and a constant large floating population
  - We can observe that the built form has increased towards the river, as the river is flooding less.
  - The green spaces are reduced. The James Princep's Map of 1822 we can see that the area had many orchards and

lot of trees cover for resting and shade on the Ghat. These green spaces are reduced considerably because of:

1. New construction over them
  2. The trees have fallen due to aging and no new plantation has been done.
- Built open spaces.

Due to high economic pressures the city's open spaces are reduced considerable. The new construction is more at the Dashashwamedh and manikarnika Ghat.

Permeability to the city has reduced, either the street is closed or the street width has reduced which has led to

1. Lack of open space
2. Unhygienic condition
3. Improper drainage
4. Increase of pressure on primary routes
5. Increase of risk during festivals





Figure 67 Pollution on Ghat

- The Ghats are very congested and not properly planned with services
- The parking facility is also not provided during melas and festivals and the narrow roads get filled up.
- The undefined patterns of Chattries of Pandas disturb the circulation of Ghats.



Figure 68 Pollution on Ghat



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### 3.8.13. Sewerage and Garbage

The sewerage line is very old and is not able to vary the load of the city. Total sewage generated in the city is 240mld of which only 90mld is treated in Sewage Treatment Plants (STPs) and the remaining 150mld is directly discharged into River Ganga and Varuna through open drains.

Today, the scene of the Ghats are much denatured by the presence of huge cylindrical often light pink coloured sewer pumping stations(5) constructed along the entire river front. These structures are supposed to pump out the sewer drained towards the Ghats, and take it towards a treatment plant. They are connected to 6 major drains. These pumps work on high electrical means which the city cannot afford to invest on. Therefore, during power cuts, which occur at regular intervals during the day, these pumps cease to function. The sewage then flows directly into the river over the Ghats. (Anon., 2001-2011)



Figure 69 Sewage pumping stations on Ghat

### 3.8.14 Inferences

Table 2 Inferences

	Varanasi	Kanpur	Inferences
Ghats	1. No. of Ghats (Due to more no of Ghats, the crowd gets disturbed)	1. Due to less no. of functioning Ghats the crowd gets accumulated at one place.	Need for proper design and management for services of pilgrims.
	2. Levels (Ghats are in different levels which is beneficial when water level changes)	2. Ghats are at the same level and it creates problem	Levels should be provided for undisrupted activities at Ghat
	3. Different type of stakeholders living on the Ghat itself, and performing daily life activities, which is alarming.	3. Most of the Ghats are deserted except festivals.	Providing facilities and design spaces for
Services	Sewage system (Proper sewerage tower are provided for controlling the river pollution)	No sewage system is provided	A proper sewage system should be proposed by authority
River ecology	Disturbed	Disturbed	Proposals to make a healthy river ecology ,like edge treatment ,floating island etc.
Trees and plants	Once a city of several gardens now having only beautiful Ghats of stones and temples all around	Scope of planting and greenery because most of the Ghats are away from dense urban growth.	Need of small forests and gardens at riverfront
Population	Growing urban population and narrow streets are a big problem	New slums are developing and creating problems	Follow all the byelaws for any riverfront and prohibit further illegal construction

Table 3 Inferences

Activities	Varanasi	Kanpur	Inferences
Bathing	1. Throughout the year <u>Lacs</u> of devotee come	1. Due to less no. of functioning Ghats the crowd gets accumulated at one place during Annual snan	Need for proper design and management for Bathing services of pilgrims.
Swimming	2. Most Ghats are in use	2. Only few Ghats are in use	Swimming facilities or club at certain Ghats for people
Boating	3. Different types of ferry and boats available	3. Only small boats are there	Ferry system can be proposed with proper planning, can be helpful for poor boatmen
Washing	4. Few Ghats are dedicated as Dhobi Ghat, and others are used by pilgrims	4. Washing is done by some local resident of slum	Should be checked
Rest houses/ Sitting space	5. Proper space for sitting due to well designed Ghats	5. Only few Ghats have resting places	Design Proposal of such spaces with help of landscape features
Other activities	6. Spaces defined at Ghats for different stake holders	6. Not such spaces defined or designed	Spaces should be designed for different activities but away from Ghats
Rituals	7. Pollution due to different types of materials used in Pooja	7. Many harmful materials have been used	Proposal of organic material in Pooja <u>Samagri</u> products



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## CHAPTER 4

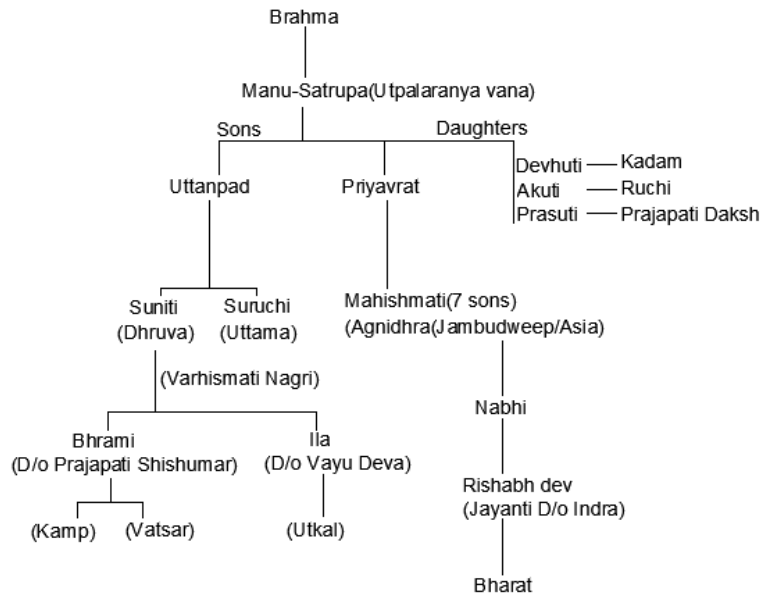
### 4.0. Site Analysis

#### 4.1. History of Kanpur including mythological references

According to Hindu mythology world has been created from four Tatvas, Akash, Vayu, Jal and Prithvi. During formation of Earth, a Demon, Hiranaksha threw it into ocean and Varah God put it out. Bithoor in Kanpur was the first place to be came out from the ocean, so life on earth started from here. Bithoor(Brahmavart), the place of Great antiquity, is the place where Brahma ,the God of creation performed the great horse sacrifice for propagating the human race on earth. Brahma performed a Yagna at Utpalaranya (most sacred place on the earth) which was a forest. After installing the image of lord Shiva (Brahmeshwar mahadeva) and completion of yagna Brahma created Swayambhuva Manu and his wife Satroopa through whom the world began to propagate. On completion of the Yagna, the forest of Utpalaranya became known as Brahmavart from which the popular name Bithoor has been derived. (mukt', 2005)



Figure 70 Origin of life on earth



(Modhe, 1986)

Figure 71 Family line of Manu

#### 4.1.2 Origin of Ganga river

According to Hindu mythology Ganga used to exist only in heaven. King Bhagirath worshipped Ganga to descend on the earth for Mokshas of their ancestors, and it called as Bhagirathi. It purified the souls of the 60,000 sons of an ancient ruler, King Sagara, who had been burnt to ashes by an enraged ascetic Kapil muni.

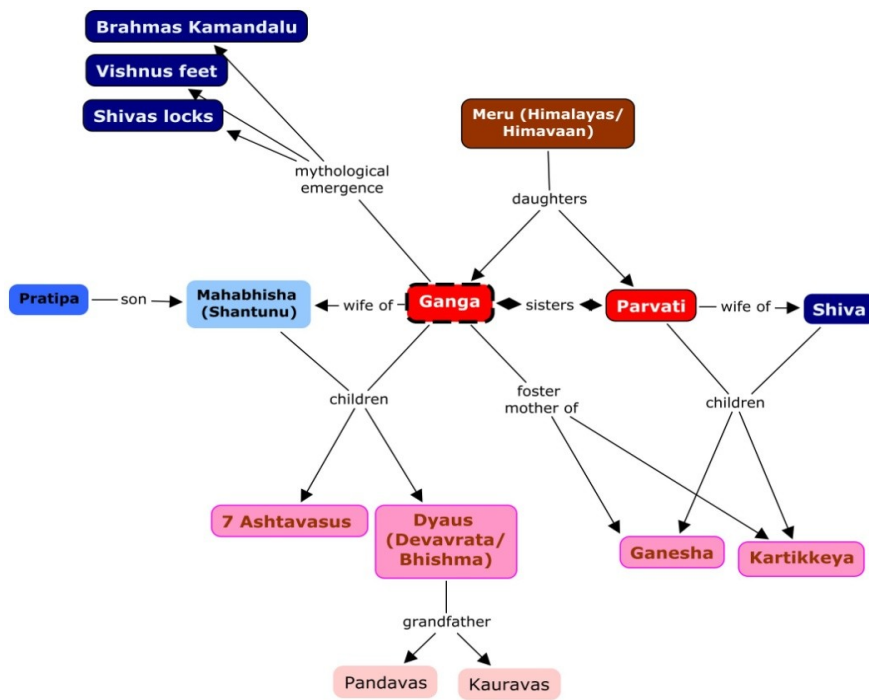


Figure 72 Origin of Ganga

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#### 4.1.3 King Dhruva

Brahmavarta, in Kanpur was also long time ruled by King Uttanpada and after that his son Dhruva left the world at the age of five and went to the deep forest Madhuban for Tapasya to regain all his rights. After six months of Tapasya, Vishnu gave him a life of 36,000 years. After that he lived and ruled thousands of years and became world famous for his determination and vow. (mishra, 1961)



Figure 73 King Dhruva

#### 4.1.4 Ramayana Period

Tradition has it that, it was in the area of Brahmavart forest( Kanpur) that mother Seeta was, in an pregnant state left by Laxmana at the bidding of Rama. The exact spot is marked by the temple of Pariyar which is on the opposite bank of Ganga at a distance of some six miles. From here she was taken in protection by Valmiki who had his Ashram (Hermitage) nearby. Two sons Lava and Kusha, were born to her and these grew up to be boys of great courage and powers.

Later Rama performed the Horse sacrifice the sacrificial horse was let loose, followed by a large army. The horse passed through the area of Brahmavart and these sons of Rama tied it up. The inevitable battle then followed in which the brave boys ,fighting alone and without knowing that they were fighting with their own father ,defeated the army. Thereupon Rama himself went out to meet them in person, recognized them as his sons and is reconciled without further blood-shed to his loving wife, Seeta. (Vajpayee, 2000)



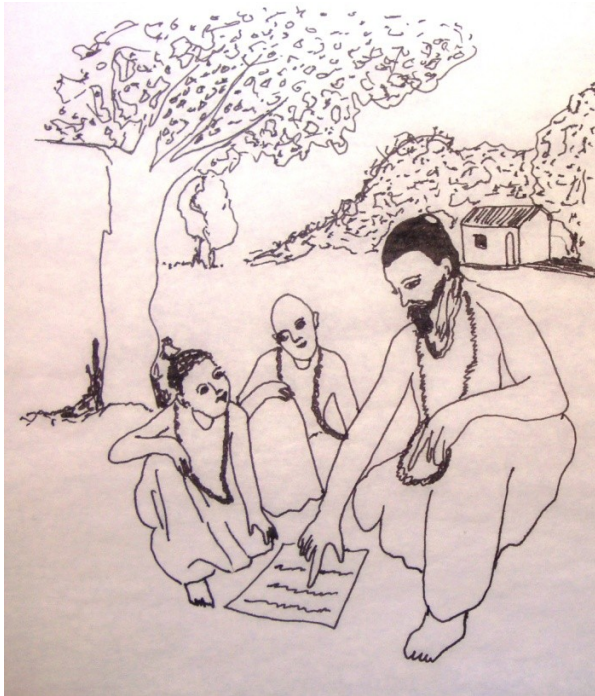


Figure 74 Sita with Lava and Kusha

#### 4.1.5 Establishment of Kanpur

1180 AD (7-12th Century) Kannauj empire

King Kanhdev (Grand nephew of King of Kannauj ,Raja Jaichand),after being inspired by the geographical and physical location of Kanpur, made his Capital at the bank of River Ganga and named "Kanhpaur" in 1217 AD ,Which is also mentioned in "Tarikh-e-Shershahi". Old Kanpur was established by him. (Modhe, 1986)

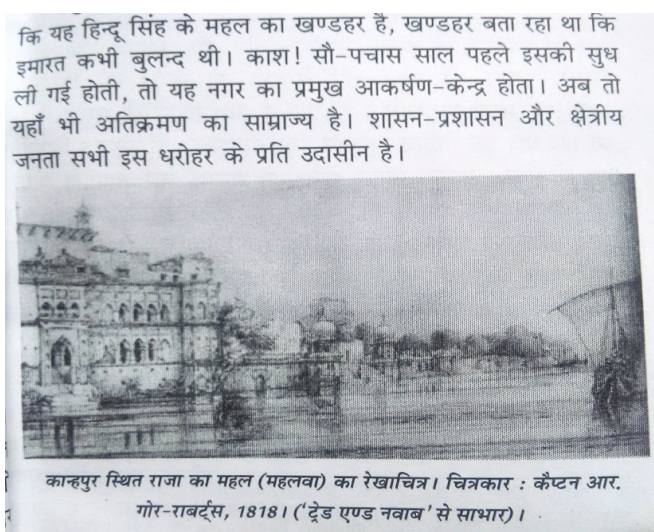


Figure 75 History of Kanpur

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- Mughal Period (1550 AD- 1754 AD)

In the region of Akbar the Great, a part of Bithoor Pargana was included in the Sarkar of Kannauj belonging to the Suba of Agra. Later along with distt. Kanpur it fell into the hands of Bangesh Nawab of Farrukhabad in 1738 and remained in his possession til 1754 when the Marathas occupied the lower Doab.

- Hindu Sing (1698-1738 AD)

King of Sanchedi, Raja Hindu Singh came for Gaga Darshan and inspired by the geographical location and environment of this area, considered this place suitable for the site of a town, he shifted here. He constructed many temples, gateways etc. At that time the whole area between Jajmau and Bithoor was full of Greenery. There was thick forest.

- Nawab Rule (1734-1775 AD)

After Hindu Sing many small Hindu dynasties ruled over kanpur.Nawab of Awadh Sadat Ali Khan took over this area into Awadh Kingdom.

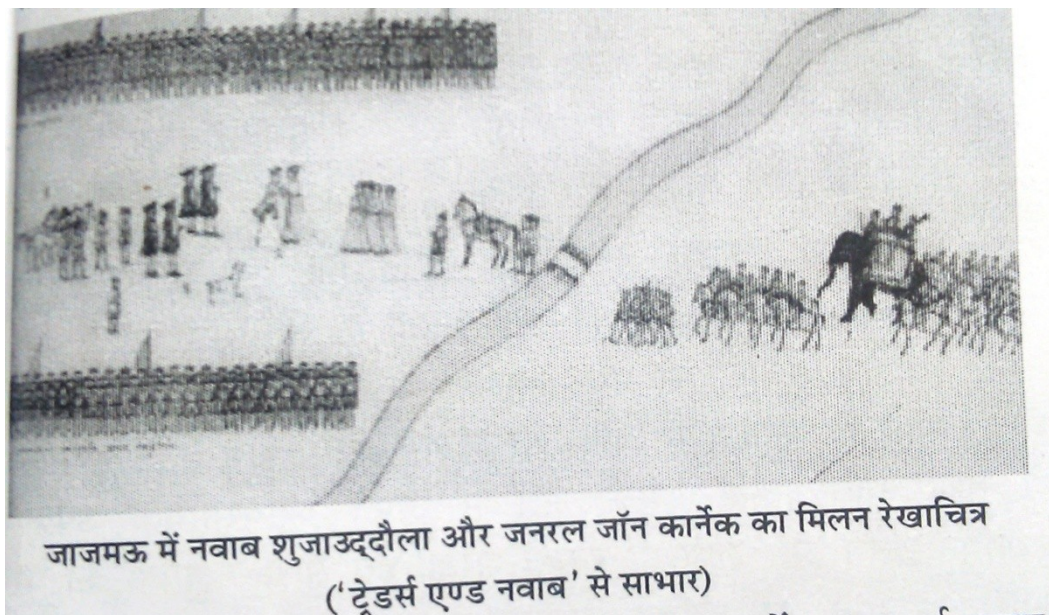


Figure 76 History of Kanpur

- Maratha Rule

Then again Marathas captured this area.in 1774 AD Nawabs again captured through Nawab Shujaudaula (1774-75) of Avadh.It was then included by Mir Almas Ali Khan, an Amil (officer) of Nawab-Vazeer. Almas Ali assigned the village in revenue free tenure to Raja Bhagmal Jat and the lands were held under his heirs until the



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abolition of Zamindari in 1952 .Almas Ali Khan built a large Mosque next to Laxman Ghat.

- Treaty of Jajmau (1765 AD) British period

In the famous war of "Baksar" in 1764 AD, between Shahalam and company general Karnek, Nawab helped Mughal emperor but lost that war. Then British company chased him and at the Bank of Ganga in Kanhpur, Nawab lost the battle again and did a treaty. They had to give 25rs. Annually to company and also company can interfere in their political decisions.

This treaty was a mile stone for company because they made their first Cantonment chawni here in 1778 AD. At that time Nawabs and Marathas were sharing the area of Kanpur. Company took over every power from Marathas and forced them to Migrate. Nawab became a dummy of Company.



Figure 77 History of Kanpur



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- Rebel of 1857

By the year 1818 AD. East India Company assumed full control over India by defeating the last Maratha ruler in Khirkee and Ashti. Consequently the Maratha ruler Peshwa Bajirao II was shifted from Pune to Bithoor. He was awarded an annual pension of Rs. 75 Lacs and jagir of Ramel. He died in 1851 having no issue but an adopted son Nana Rao or Nana Saheb. Govt. refused to accept him and as the legal heir of Bajirao and rejected his claim for succession. Same situation was at Jhansi and other places. Thus there was resentment amongst a large number of feudal Lords resulting into an atmosphere of mutiny in North India. (Kapoor, 2014)

Kanpur and Nana Rao took a leading role in "First war of Independence".



**Figure 78** Massacre Ghat rebel at Kanpur

- Kanpur the centre of Trade and Industries

Bithoor, Jajmau and Old Kanpur were three major places where Lakhs of devotees came from far off places to have a holy dip at Ganga. River had flow of sufficient water throughout the year making it an important mean of inland water ways. Jajmau Ghat was famous for an important business link between South (Bundelkhand) and North (Awadh) of Kanpur and also between east (Varanasi) and west (Farrukhbad). Stretch of Jajmau to Bithoor is 24 km.

## 4.2. Relationship of River with settlement

### DEVELOPMENT OF KANPUR THROUGH AGES -

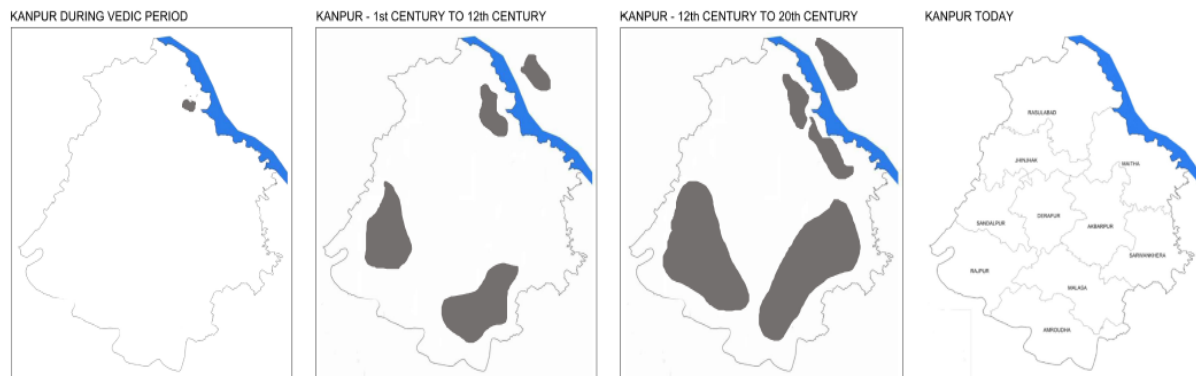


Figure 79 Growth pattern of Kanpur

### 4.2.1. Present scenario of the City

- Rituals and daily routine



Figure 80 Rituals





Figure 81 Rituals

- Industries and Tanneries



Figure 82 Chemicals of industries

Fecal coliform- Kanpur has millions of gallons of untreated chemicals which cause cancer and other diseases. Smaller tanneries are worst offenders for the pollution in the river because they are running in extremely unhygienic conditions, with no infrastructure and no planning.



Figure 83 Chemicals of industries



- 
- Levels of Chemical and metals into river

**BOD-** A good indicator of overall health of the river. But tanneries discharge of high oxygen demand effluent in Ganga and it kills all fishes and plants in the river.

In upstream of Kanpur Before Bithoor area, the results shown that BOD level is already high at 3.7 mg/l, that is almost twice of global permissible limit of BOD in river. In downstream after Kanpur, it is much worst as the BOD Level is dangerously high at 8.7 mg/l that is a jump by 135%.

That is why it is difficult for Ganga to support aquatic life.

Total **coliform** in Jajmau area -590 MPN /100 ml

**Fecal coliform**-5 MPN /100 ml (50 MPN /100 ML is acceptable)

**Chromium** is one of the most dangerous chemicals coming from tanneries during the process of retanning and dyeing process,

Ganga is carrying .020 mg/l chromium and this is four times more than globally permitted amount

**Copper level**- .020 mg/l, 7 times more than globally permitted.

**Mercury level**- 0.0029 mg/l (river), 3 times more than acceptable limits. 7-8 times higher in ground water.

Affect the function and system of central nervous system for men, pregnant women, and children for their cognitive thinking, memory, attention, language, fine skills as well as for wild life.

**Results**- black and red color drinking water, tooth, bone and skin diseases.

(uppcb, n.d.)

- Diversion of Water

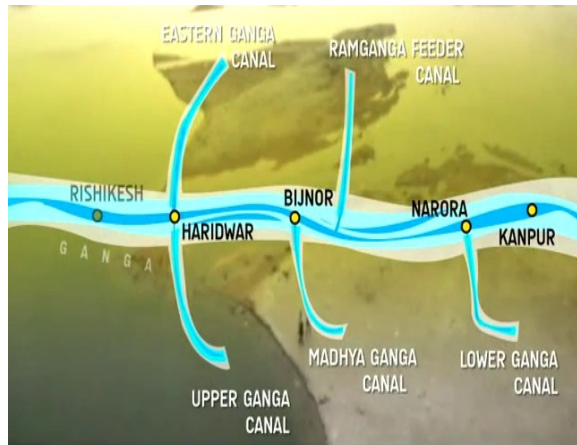


Figure 84 Diversion of river water

Depletion in the water level which reduces the slope. Increases the density of pollution, and reduced the self cleansing capacity of river. (uppcb, n.d.)

- Two dozens of drains carrying household waste into Ganga direct like tributaries of river.

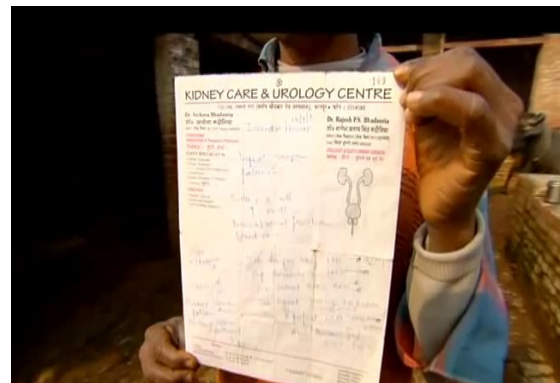


Figure 85 River pollution

- Reason for Pollution



Figure 86 Sources of pollution

(uppcb, n.d.)



- 
- Types of annual snan celebrated at Kanpur Ghats

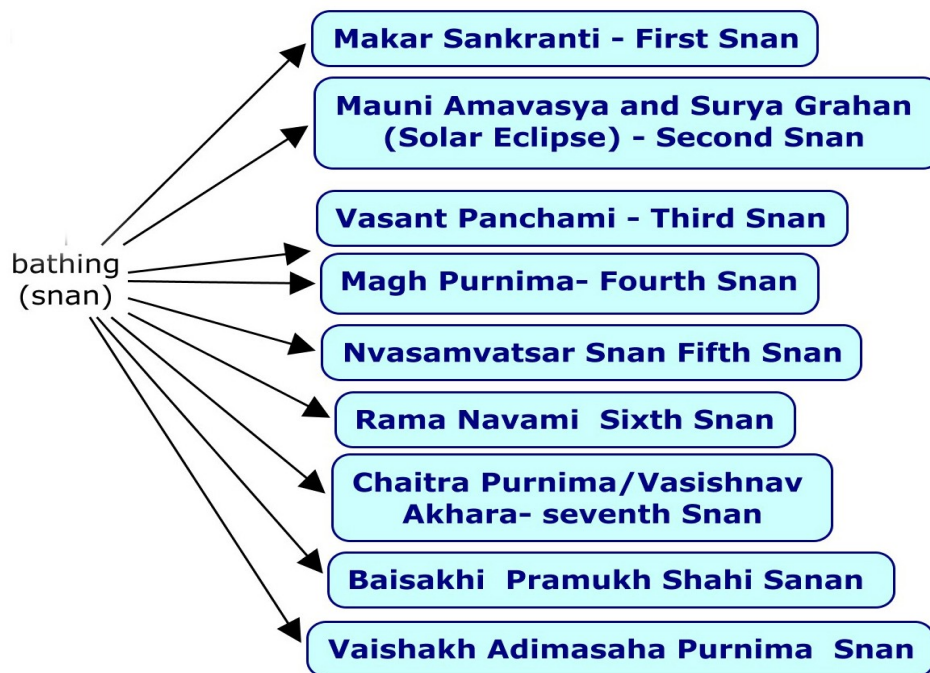


Figure 87 Annual snan

#### 4.3. Ganga Action plan

To clean the mess, in 1985 the Indian government launched world's most ambitious initiative to restore a river, the Ganga Action Plan (GAP). The aim was to intercept the sewage and treat it before discharging it into the Ganga. Seven years later, in 1993. After severe criticism about the failure of the plan, in 2009, the government re-launched it with a reconstituted National Ganga River Basin Authority. The river also got the status of a National River at this time. Despite these efforts, which cost Rs 900 crore (US\$147.7 million), environmentalists warn that the river's condition has in fact deteriorated. (Bhaumik, august 2011)

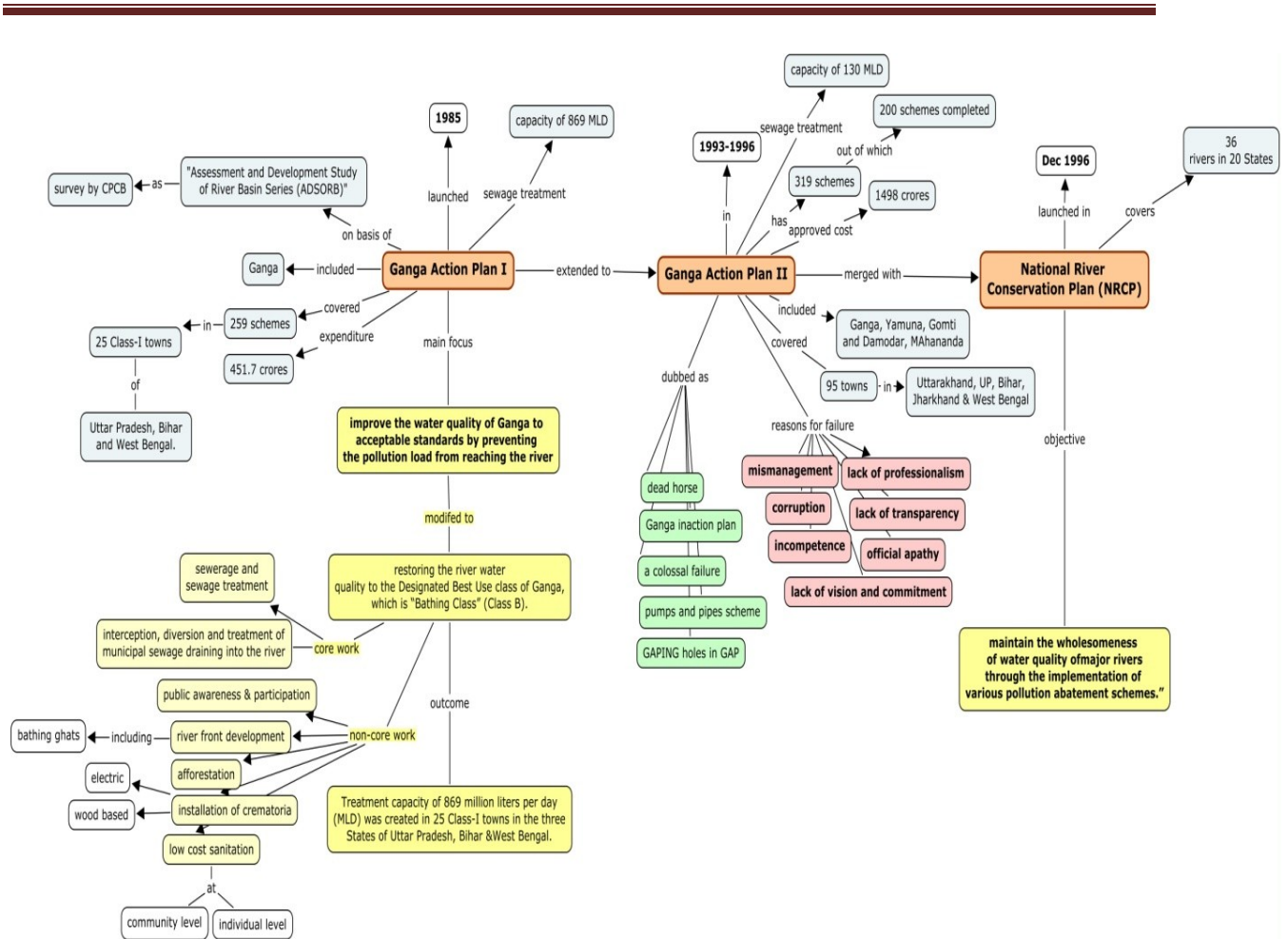


Figure 88 Ganga action plan

### Reasons for the failure of The Ganga Action Plan (GAP)

- Inappropriate Environmental Planning.
- Establishment of Sewage Treatment Plants on highly productive crop lands.
- Least input from multidisciplinary environmental experts in policy planning of the Ganga Action Plan.
- Improper mass awareness in different projects.
- Improper Sanitation System put up by the local bodies.

Prime Minister Narendra Modi, Standing on the Banks of the river Ganga a day after his election triumph announced again the projects for cleaning up the filthy waterway of Ganga.

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## Others

- Efforts were made on to restore the pre-shift river course of Ganga through construction of a barrage in the upstream of Kanpur called Ganga Barrage, but not much effective.
- A Community latrine cum biogas project launched by Non Renewable Energy Development Agency (NEDA) besides Ghats also have many loopholes which was started to stop open defecation by the communities living in the vicinity. It goes directly in Ganga and the project itself become a source of pollution for the river. (Anon., 2012)



## 4.4 Threats to aquatic life

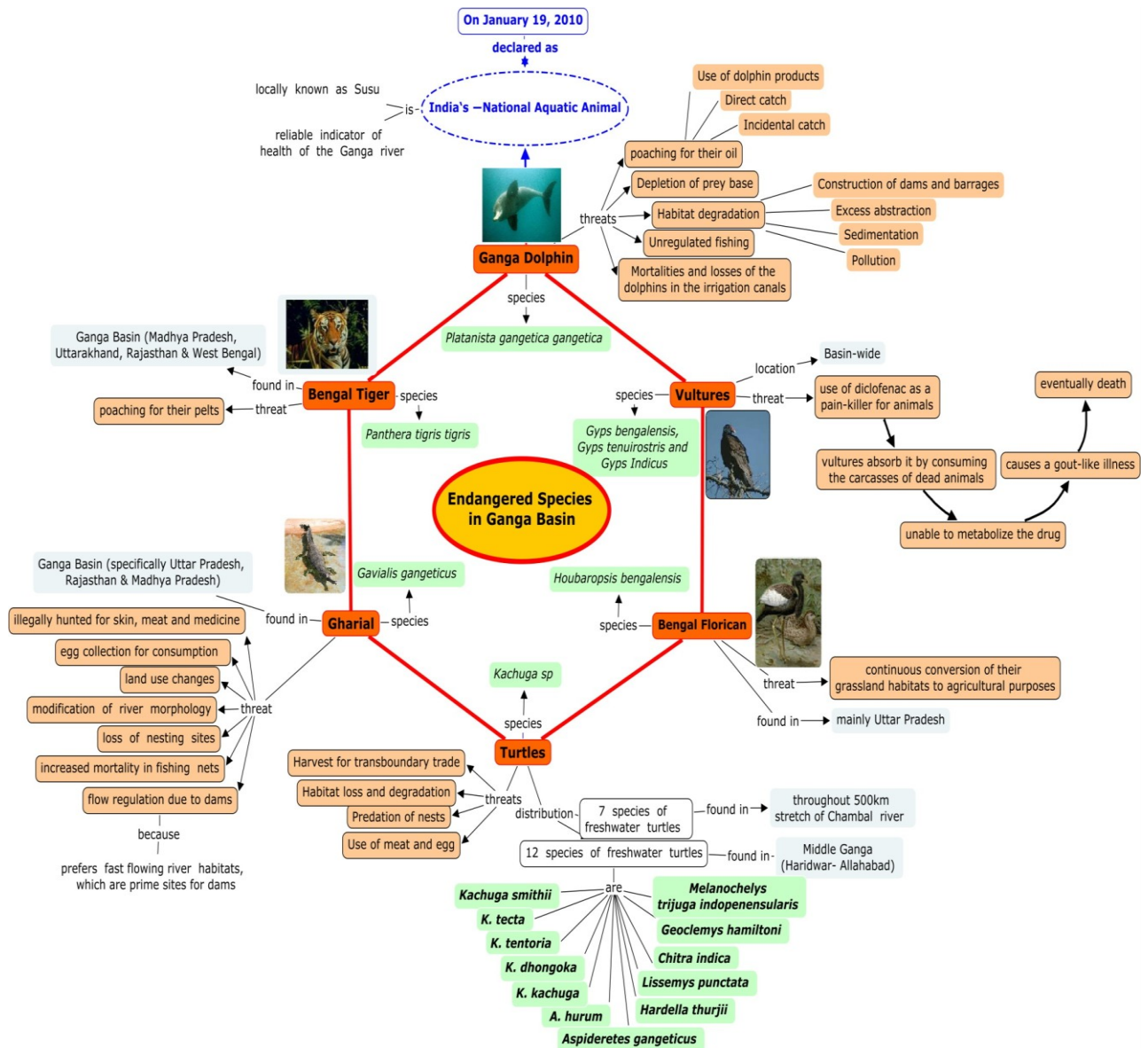


Figure 89 Aquatic life of Ganga (uppcb, n.d.)

## 4.5. Natural Forests

Kanpur city and Dehat has 5400 hectares of forest area. Consequently, much of the natural flora and fauna has disappeared over the years due to various anthropogenic pressure. However, the city currently has negligible area under forest. The Allan Forest which originally had 200 hectares now reduced to 50 hectares only. Interestingly this natural forest patch harbours the Kanpur Zoological Garden (Allen Forest Zoo). The other area called Sanjay Van Banglia has 20 hectares. Currently these two forest patches, serves as the green lungs for the city. The native species

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are Neem, Kadamb, Mango, Gulmohar, Chilbil, Kaner, Chitwan, Guava, Jamun, Peepal etc.

#### 4.6. Ghats of Kanpur

##### 4.6.1 Brahmavarta Ghat

- Mythological Importance

It was the place where Brahma performed the horse sacrifice prior to propagating the human race in the world. A big nail embedded in one of the steps of the Ghat is pointed out as the nail of the shoe of the sacrificial horse. After taking bath at the Ghat devotee worship the nail by offering the flower fruit and coin.

- Historical Importance

During time of Peshwa Bajirao, the Ghat was renovated and many new Ghats were constructed as well as temples. This Place is an archaeological site and old monuments have great historic value.



Figure 90 Brahmavarta Ghat google image

- Landscape Features

Scenic beauty is amazing, Temple and fort Architecture is compliment to the river landscape.

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#### 4.6.2. Dhruva Teela

- Mythological Importance

Long time ruled by King Uttanpada. It was then a country between the rivers Saraswati and Drishadvati. The remains of an Old fort on the right bank of Ganga are even today pointed out as the fort of King Uttanpada. At this place his son Dhruva born.

- Historical Importance

The place is a protected monument under the Ancient Monument preservation Act.

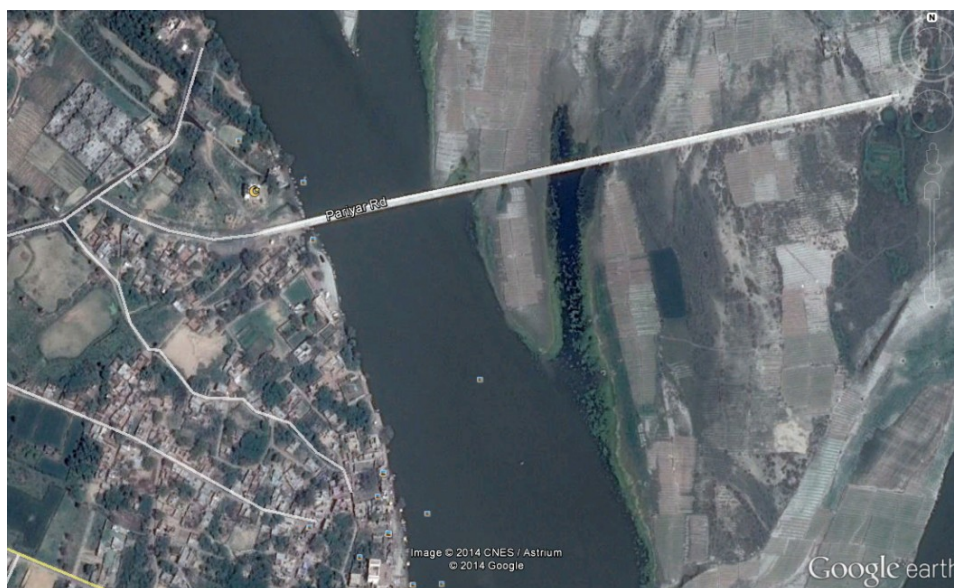


Figure 91 Dhruva teela google image

- Landscape Features

The big mound comprising the remains of the fort is on a high cliff below which flows the deep stream of Ganga. The mound has rocky strata towards the side of the river -still a great portion of the area has been gradually eroded and a temple of Sri Hanuman situated right on the cliff is now in imminent danger of being washed away.



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#### 4.6.3. Laxman Ghat

- Mythological Importance

Mother Sita was, in a pregnant state left by Laxmana at the bidding of Rama in Bithoor. She was taken in protection by Valmiki who had his Ashram (Hermitage) nearby. Laxman Ghat was the area where Laxmana took a night stay and then left in morning to Ayodhya after leaving her.

- Historical Importance

This temple is situated at the bank of Ganga besides a Mosque so, the place has great importance in term of social unity and is centre of attraction for pilgrims and tourists.



**Figure 92** Laxman Ghat google image

- Landscape Features

Scenic beauty is amazing; Ghats are very beautiful example of Maratha architecture. The site has a very mysterious entrance due to land profile and the surrounding.

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#### 4.6.4. Almas Ali Mosque

- Mythological Importance

This Mosque was constructed by Nawab Almas Ali, during the rule of Nawab Shuja-ud-daula of Lucknow. It is said that he was a converted Muslim and Nephew of Raja Bhagmal of Kanpur.

- Historical Importance

This is the only mosque in the world situated on the bank of river besides a temple. In its time it was an imposing building having been constructed by Almas Ali Khan, the local Governer. It stands at the commanding place on the bank of Ganga near Laxman Ghat. It is now in a dilapidated condition. Sharing a common face of many temples and buildings which have been reduced to ruins by neglect in ill-fated Bithoor after the "Mutiny".



Figure 93 Almas Ali mosque google image

- Landscape Features

Scenic beauty is amazing; Ghats are very beautiful example of Maratha architecture. The site has a very mysterious entrance due to land profile and the surrounding.

#### 4.6.5. Valmiki Ashram

- Mythological Importance

The famous Sage Valmiki, the famous author of the Sanskrit Ramayana known after his name, had his hermitage. On that spot, which is on a high mound, there now

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stands an ancient temple known as Valmiki temple. The temple was renovated and added to Peshwa Beira II. In the premises of the temple there is a place called Sita Rasoi (a masonry building) and an old temple named Kapaseshwara, after another name of Lord Rama. An old tower with myriads of places for keeping earthen lamps, which in the good old days used to be lighted on the occasion of Dashehra, also stands within the precincts of the temple .Adjoining this tower there is a small verandah in which hangs an enormous brass bell.

- Historical Importance

During time of Peshwa Bajirao, the complex was renovated and a new temple was constructed in Maratha architecture.

- Landscape Features

The location of this Ashram is in the heart of the city, besides Luv-Kush ashram and has small garden and small forest area in backyard.

#### 4.6.6. Rani Ghat

- Mythological Importance

This Ghat is in Old Kanpur, constructed by a king for his wife, that is why named Rani Ghat.

- Historical Importance

Renovated by Local zamindars and traders time to time. A Mahakaleswar temple also constructed by Local people in 17th century.





Figure 94 Rani Ghat google image

- Landscape Features

Sandy soil having a sand quarry on the edge of the river near Ghat. River has shifted 30 meters away from the Ghat and temple.

#### 4.6.7. Bhairav Ghat

- Mythological Importance

This Ghat is in Old Kanpur, constructed for Cremation purposes having Mata mender in the complex.

- Historical Importance

Renovated by Local zamindars and traders time to time. A Kali temple and Hanuman temple also constructed by Local people in 19th century (1980 AD)

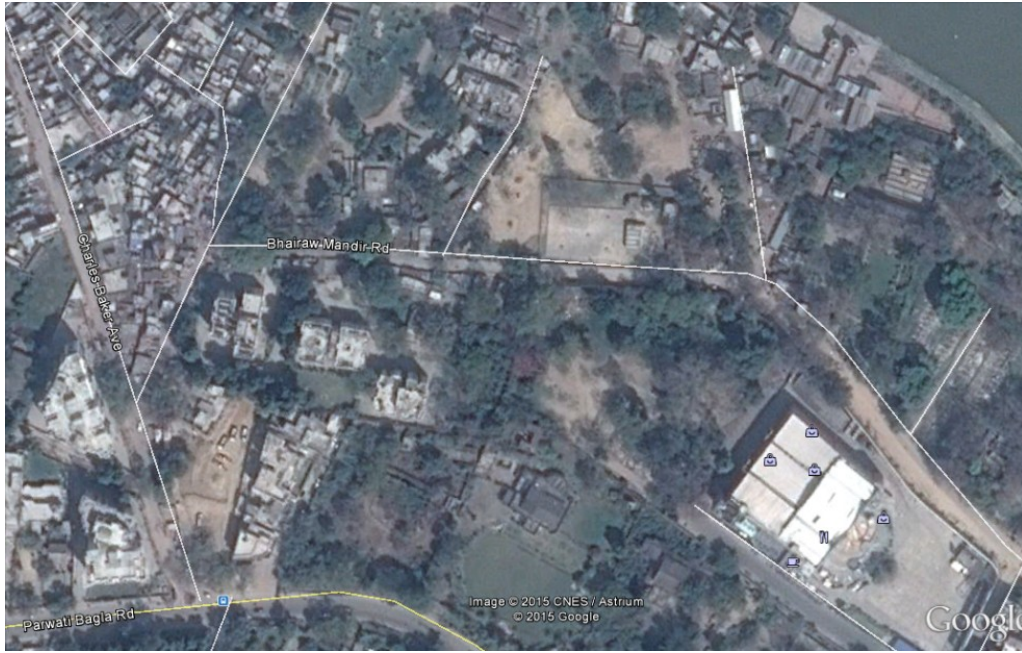


Figure 95 Bhairav Ghat google image

- Landscape Features

This is a cremation Ghat, having a lots of space behind used as dump yard, which can be used as any activity space or landscape garden.

#### 4.6.8. Parmat Ghat

- Mythological Importance

This Ghat was constructed for trading purpose. Anandeshwar temple is on this Ghat, which was constructed on the name of a divine cow Anandi protecting Shivlinga under the earth.

- Historical Importance

Boats carrying goods for trade used to stop at this Ghat for loading and unloading. Octroi was charged from them for such goods and permits were issued. A pakka house was constructed at that time for this and people used to call that area "Permat" from word "Permit". There are many small Ghats like Janana Ghat, Kamleshwar Ghat, and Ganesh Ghat etc.



Figure 96 Parmat Ghat google image

#### 4.6.9. Sarsaiyya Ghat

- Historical Importance

This Ghat is famous for boating as this Ghat is most cleaned among all. Ghat has many blocks having seat for different pandits serving their own pilgrim party of Pilgrims. There are resting/changing rooms on the upper floor for visitors.

- Landscape Features

There is a small island into the river where men play games for their recreation.



Figure 97 Sarsaiyya Ghat google image



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#### 4.6.9. Guptar Ghat

- Mythological Importance

This Ghat was constructed for trading purpose. Later on Temples of Mata, Hanuman and Shiva added. Last renovation happened in 1998 AD.

- Historical Importance

This Ghat was the meeting point of Freedom fighters during 1857 Rebel, that is why called as Guptar Ghat. There is swimming club on Ghat sponsored by regional people. Women Ghat has separately constructed called Janana Ghat.

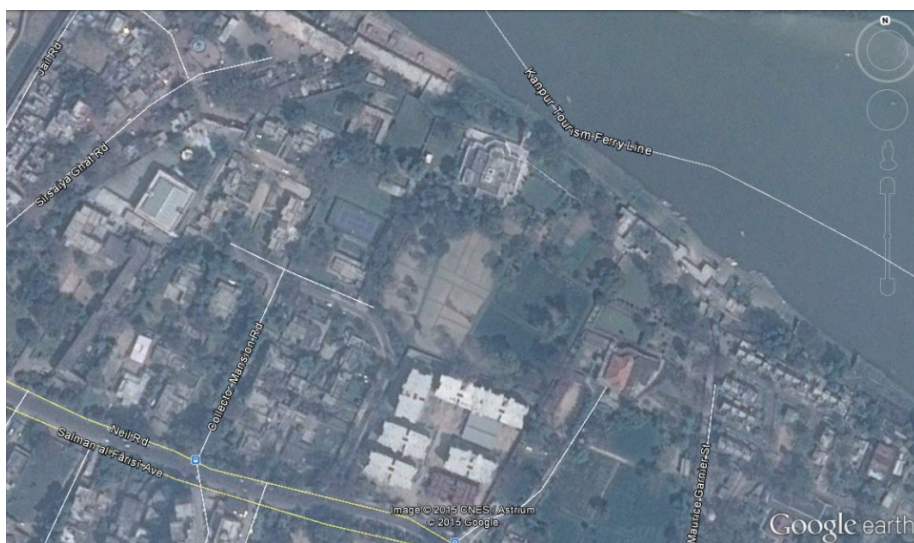


Figure 98 Guptar Ghat google image

- Landscape Features

The Ghat is situated besides slum, so the entrance is not very promising, but the river side view is beautiful and the area is very peaceful.

#### 4.6.10. Massacre Ghat

- Mythological Importance

This Ghat is also known as Satti Chaura Ghat, because Sati women used to burry at this place only with their dead husbands, and it was a cremation Ghat.

- Historical Importance

This Ghat is also known as Nana Rao Ghat because once renovated by him. During 1857 mutiny, there was a big clash between British and Indians and hundreds of people murdered that is why also known as Massacre Ghat.



**Figure 99** Massacre Ghat google image

- Landscape Features

The surrounding of this Ghat is a forest and the way towards this Ghat is an avenue path which is while travelling is very nice experience.

#### . 4.6.10. Jajmau Ghat

- Mythological Importance

Once full of green forest now became most polluted due to chemicals.

- Historical Importance

This Ghat was constructed for trading purpose and was the centre for routes from all four sides. Here is also a burial ground for Hindus on a mound.



**Figure 100** Jajmau Ghat google image

- Landscape Features

The location of the place is very nice and the mound of burial ground is enhancing the landscape of the river and the Ghat.



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## CHAPTER 5

### 5.0 Concept

#### Inspiration- A poem

#### गंगा तुम अब भी बहती क्यूँ हो?

(Inspired by a poem of Miss. Archana)

गंगा की बात क्या करूँ गंगा उदास है, वो जूझ रही खुद से और बदहवास है.

ना अब वो रूप रंग है ना वो मिठास है, गंगा जली है- जल नहीं गंगा के पास है.

खोई थी अपने आप मे वो कौन घड़ी थी, सुनते ही भागीरथ को नीचे दौड़ पड़ी थी

आई थी बड़े शौक से धरती पे बेचारी, नागिन सी डोलती हुई -हिरनी सी उछलती.

आई थे मेरे गाओं को गिरती व सम्हलती, गरिमा थी जम्बूद्वीप की-गरिमा स्वदेश की.

जिससे ब मिली वो बड़े आदर से मिली है, नीचे उतर के दौड़ के सागर से मिली है.

देखो ज़रा पर आज क्या गंगा का हाल है, जीना मुहाल है- इसका बहना मुहाल है.

जो कुछ भी आज हो रहा गंगा के साथ है, हमको भी पता है ये उसमे अपना ही हाथ है.

बांधो के जाल मे कहीं नहरों के जाल मे, सिर पीट-पीट रो रही शहरो के जाल मे.

नाले सता रहे पनाले सता रहे, खा-पी के कचरा फेंकने वाले सता रहे.

असहाय है, लाचार है , मजबूर है गंगा, अब हैसियत से अपनी बड़ी दूर है गंगा.

अब हैसियत से अपनी बड़ी दूर है गंगा.

घर-गाव मे धन धान्या की माला इसी से है, जीवन है, रंग-रौनक , उजाला इसी से है.

केवल नदी नहीं ये, संस्कार है गंगा, मुक्ति का द्वार है, धरा श्रिगार है गंगा.

गंगा के पास दर्द है, आवाज़ नहीं है, यहाँ नारी को व्यथा कहने का रिवाज़ नहीं है.

करना है कुछ उपाय अब, सबको जगाना है, गंगा पे आँच आ रही-गंगा बचाना है.

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The river has been the life of the city and no one can ever envision Kanpur without the river Ganga. Ghats along this river are readymade open spaces which connect urban to the sacred and a part of the cultural Landscape, that gives the city its identity. But the poignant part of the narrative is that in the last few decades the story of the Ganga has changed a lot, and so of its Ghats. The Ghats on the banks of the river have lost their heritage value and association with the people.

So if there will be a proper management plan and guidelines for the river, well designed and approachable Ghats for pilgrims, the local people, the urban populace and tourists , then people will start flowing into these spaces and certainly they will realise their responsibility to clean the river and protect its heritage settings, including Ghats.

For revival of polluted river and Ghats we have to take a STEP....



Figure 101 Concept

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A step to reclaim, to restore, to reconcile, and to redevelop these Ghats and Ganga River, once again. So that, Kanpur city can become a “Smart city”. “Smart” not only in terms of infrastructure but smartness of its people to save their valuable cultural and natural heritage and their responsible approach towards the river.



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## CHAPTER 6

### 6.0 Design Intervention-

#### 6.1. Area delineation

For regional level design Intervention, with the river and its Ghats in focus, major ridges have been marked along the river, on both of its banks . Site has been demarcated through the major ridges along the river and the feeder valley lines, along with the major highways, roads and railway lines, forming the base map. The area thus demarcated starts from Bithoor area, which is on North West, to Jajmau area, which is on south east side of Kanpur distt. The entire stretch is 23 km. long, having 10 major destination Ghats like, Brahmavart Ghat, Laxman Ghat, Rani Ghat, Bhairav Ghat, Parmat Ghat, Sarsaiyya Ghat, Guptar Ghat, Massacre Ghat, Jajmau Ghat etc. All these Ghats are on the banks of river Ganga, complete with temple complexes, historical forts and buildings.

##### 6.1.1. Regional level stretch

- Issues

Different types of maps have been generated through literature study and site analysis, like, Road network map, Activity map, Chronology map etc. SWOT analysis of each and every Ghat has been done and Issues have been identified.

- Inferences

Problems of each and every Ghat have been considered. Inferences have been drawn from site analysis and surveys of Ghats like;

1. Shifting of river,
2. Encouraging fauna on the banks of the river through plantation,
3. Water pollution,
4. Problem of un-authorized encroachment,
5. Sewage flow into river,
6. Need of tourism circuit,
7. Lack of any kind of open recreational space in the city etc.

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All these inferences have been considered in Landscape design guidelines for the entire stretch.

- Landscape guidelines

Design guidelines have been developed for the entire stretch along the river, which are applicable on each and every Ghat like;

1. Proposal of green buffer zone along the entire 23 km stretch,
2. Proposal of Garbage collectors in surrounding Nalas and streams,
3. Sewage treatment,
4. Garbage disposal management,
5. washing activities on Ghats,
6. Bathing and swimming on Ghats,
7. Plantation of trees, shrubs and groundcovers on the banks of river Ganga,
8. Guidelines for parking near Ghats and temple complexes
9. Removal of pollutants coming from agricultural fields,
10. Proposal of ferry route along the entire stretch etc.

Some Ghat specific guidelines are also proposed for each and every Ghat, like;

1. Guidelines for prevention of erosion of edges of river,
2. Well defined approach roads,
3. Reconstruction of damaged Ghats and valorising the monuments through Landscape design,
4. Eco sensitive method of cremation on Ghats,
5. Treatment of chemical effluents from tanneries before they enter into the river, etc.

With the help of these guidelines and proposals we can reduce water pollution into the river, over congestion of people, degradation of Ghats and monuments, improper services and management on Ghats etc. So that we can re-design Ghats as recreational and community gathering space besides pilgrimage, as Kanpur city lacks any kind of open space for recreation and rejuvenation.

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A ferry route also has been proposed to enhance the pilgrimage and tourism as well as engagement of local people to the entire stretch. The river trail is of 20 km.length. An electric Solar shuttle boat(From Brahmavart to Jajmau) which shall be powered by means solar energy with a carrying capacity of , 10- 15 adults can run at an average speed of 20 km/hr. If the boat is taking halt of 15 min. at each 10 destination, the total travelling time of this ferry route will be 4.5 hrs.

After proposing Landscape guidelines for the entire stretch of Kanpur Ghats on Macro level, I have selected a specific Ghat for detail design from macro to micro level as a pilot project, to showcase the application of the guidelines as well as making them most sought after place through landscape design.

#### 6.1.2. Pilot project

I have chosen Parmat Ghat and surrounding area for detailed landscape master plan because, this area has a great potential to be designed as a big open space for Kanpur people and to use as a recreational hub because of an abandoned cotton mill, Algin mill, which is located near the Ghats.

#### Design Components-

- Parking

The area has no parking provisions for visitors creating traffic congestion near temples and Ghats and this was a major challenge. I have proposed a bus stop at the entrance of Parmat area for tourists. Separate parking for staff of Mill as well as for govt. Offices which are located near Ghats. Signage has been provided at the entrance Gateway of Parmat area as well as at distant places till the Ghats the ghats are reached, guiding and informing the people to effectively and smoothly use the space.

- Algin Mill.

As my topic is revival of holy river Ganga and its Ghats, so for micro level project, I proposed revival of the entire stretch of Parmat Ghat, the river and to redevelop mill area as a pilot project. I have taken a small portion of the mill till the stretch of Ghat,



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and designed it as if in future there will be any river front development then what would it be like.

I have proposed mill area to be developed as a recreational park and the historic Mill buildings to be developed into a Mill museum.. Some buildings of the mills demarcated as of heritage value would be retained and rest of all Which are non-descript buildings would be demolished. Some machines would be proposed in mill buildings for exhibition, and it would be serve as museum. Existing trees are preserved and new small heighted trees and shrubs have been proposed. As this area is itself green so no need of bigger tree plantation on approach road, and in park.

With the proposal of night exhibition, Kanpur Kala pradarshini and Haats, I have encouraged the involvement of Slum dwellers residing in that area into recreational activities. I have proposed new sewage tanks near free spaces so that treated water can go into Ganga, by flowing at different levels of pebbles, sand, plants, near edges of river and less pollute the river, and Slum dwellers can also get sufficient recycled water from the sewage treatment plant.

Mill area has been divided into two zones , one which is having old buildings of mill as a museum and second one is jogger's and recreational park, having different activity zones like, watch tower, food plaza, children play area, picnic area, lawn etc. This will engage the local people and become a most sought after destination of the city. The opening of the Park is directly leading us towards Ghats, so that it can connect people to Ghats directly and justify the revival of Ghats and river in true Sense. An approach through this park will offer the people an alternative and uncluttered access to the historic Ghats. Therefore, many people who were discouraged by the existing circuitous, cluttered and busy narrow lane leading to the Ghats, will start coming to the Ghats happily.

- Streets and approach road

Streets and roads have been designed as no vehicle zone in Ghat area. Signage, bollards, lighting fixtures has been proposed. Small chabutras and sitting spaces has been developed on negative spaces in the street, which has been used as parking spaces earlier. Drainage has been provided on both sides. Old trees have been

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protected by making chabutras and leaving enough exposed soil space around the trunks so that the trees can maintain their good health and it is also working as sitting space for pilgrims and sadhus , which is a part of ancient Indian tradition.

- Anandeshwar temple and Ghat

Anandeshwar temple on the Parmat Ghat is the most visited Ghat of Kanpur, and due to traffic, vehicle congestion, lost street character and haphazard movement the area is very clumsy and un-organised. River is polluted and Ghats are dead. For design solution Ghats have been provided sitting spaces, furniture, dustbins, pergolas and wooden decks as viewpoints. Boundary walls around small temples and forts have been demolished and sitting spaces has been provided with climbers and small plants. Separate sitting space has been designed for beggars near temples, and Chattri spaces have been designed on the steps for pundits and their followers.

Dustbins have provided at 25 m centre to centre distance on Ghats and near streets and temples together with a complete management plan for the eco-sensitive disposal of waste. Edges of the river are planted with small plants, ground covers and with some trees except Ghat area. Boat parking has been proposed for ferry route.

Some models have been created through landscape design intervention on micro level, for revival of Ghats. These models and proposals have been developed for application to any Ghat along the stretch of river Ganga.

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