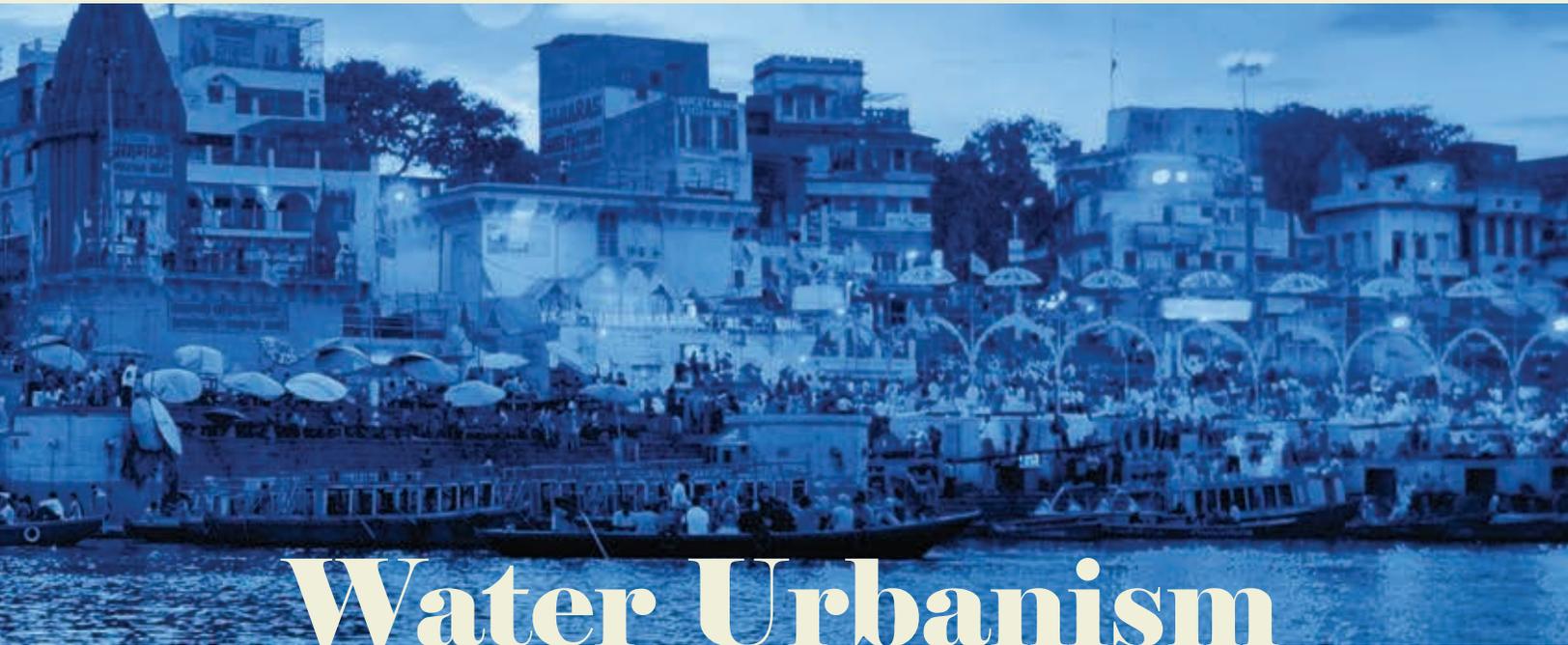


Project Varanasi



Water Urbanism



Varanasi Design Studio
INDIAN INSTITUTE OF TECHNOLOGY KHARAGPUR

In association with:

Graduate School of Architecture, Planning and Preservation (GSAPP), Columbia University, NYC, USA
Indian Institute of Technology (BHU), Varanasi, India

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Water Urbanism

Varanasi Design Studio



Indian Institute of Technology Kharagpur

In association with:

Graduate School of Architecture, Planning and Preservation (GSAPP), Columbia University, NYC, USA
Indian Institute of Technology (BHU), Varanasi, India



*“Benaras is older than history,
older than tradition, older even
than legend and looks twice as
old as all of them put together.”*



Mark Twain



*This work is dedicated to
Late Dr. Dhrubajyoti Ghosh (1947-2018)*

An ecologist by heart; a UN Global 500 Laureate; former chief of Department of Environment, Government of West Bengal, India; former member of the Board of Trustees, Worldwide Fund for Nature, India; and former Regional Chair for South-Asia, Commission on Ecosystem Management, IUCN (International Union for Conservation of Nature).

Dr. Ghosh, the wetland warrior, introduced the East Kolkata Wetlands to the world and worked for its conservation throughout his life. His innovative community-based designs for the treatment and reuse of wastewater have been adopted under the Ganga Action Plan by the Government of India and also, by the World Bank for Water Management Technology.

Working closely with Dr. Ghosh was an immense learning and eye-opening experience for all of us during the Water Urbanism Studio in Kolkata last year. His principles on finding wealth from the waste amazed us. His teachings and words will remain with us and inspire us forever.

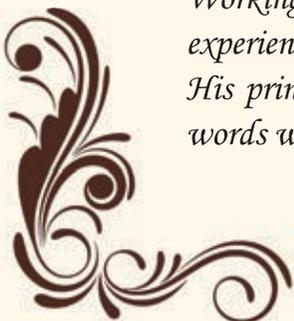






Table of Contents

Table of Contents	vi
List of tables	vii
List of figures	vii
Preface	viii
Chapter 1 - Journey along the Varuna: Adi Keshav Transect	1
1.1 Introduction	2
1.2 Objective	2
1.3 Methodology	3
1.4 Timeline of the field studio	3
1.5 SWOT Analysis	5
1.6 Conclusion	7
References	7
Chapter 2 - Urban Water Culture in Transition – Spirituality to Economy : a study of Practice Pockets along Panch-GangaTransect	9
2.1 Introduction	10
2.2 Objective	13
2.3 Framework	13
2.4 SWOT Analysis	15
2.5 “So-called” Thresholds of Progress	15
2.6 Conclusion	17
References	18
Chapter 3 - Flow, Flux and Temporality as design inspiration: ManiKarnikaTransect	19
3.1 Introduction	20
3.2 Objective	21
3.3 Methodology	21
3.4 Timeline of the field studio	22
3.5 Evolving Experiences	28
3.6 Conclusion	31
References	31
Chapter 4 - Exploration of Local Social Systems in the city of Varanasi: Dashashwamedh Transect	33
4.1 Introduction	34
4.2 Objective	35
4.3 Methodology	35
4.4 Timeline of the field studio	36
4.5 Narrative of the evolving experience	36
Chapter 5 - Social Scale of Water: Kedar Transect	41
5.1 Introduction	42
5.2 Objective	43
5.3 Methodology	43
5.4 Timeline of the Studio	44
5.5 Research Synthesis	47
5.6 Conclusion	49
References	49
Chapter 6 - Social and physical transformations of urban landscape around water use and challenges ahead: Assi Transect	51
6.1 Introduction	52
6.2 Methodology	53
6.3 Timeline of the field studio	53
6.4 Narrative of the evolving experience	58
6.5 Conclusion	60
References	60
Chapter 7 - The Nomadic Landscape: Sandbanks of Varanasi	61
7.1 Introduction	62
7.2 Objective	63
7.3 Methodology	63
7.4 Timeline of the field studio	63
7.5 SWOT Analysis	66
7.6 Conclusion	68
References	68
Epilogue	69
Picture Gallery	74
End-Term Review Presentation - Indian Consulate, New York City, USA	83

List of tables

Table 5.1 Comparison of different zones based on identified parameters from a field visit	47
Table 5.2 Existing service level of water supply system	48

List of figures

Figure 1.1 The Transect (source: Google Earth)	2
Figure 1.2 Transition from farmlands to villages	3
Figure 1.3 Transition of kunds from soft-scape to hard-scape	4
Figure 1.4 Villages	5
Figure 1.5 Bridges along River Varuna	6
Figure 1.6 Proposed master plan (part) for Varanasi Development Area (Source: VDA)	6
Figure 2.1 Panchganga Ghat from the river.	11
Figure 2.2 A sketch of Panchganga Ghat highlighting the bamboo poles for 'Akash-deep' festival.	11
Figure 2.3 Kabir Math	11
Figure 2.4 Sketch of Alamgiri Mosque	12
Figure 2.5 A handloom weaver's work space	12
Figure 2.6 Court room dating back to the British Raj	13
Figure 2.7 Framework of Analysis	14
Figure 2.8 Methodology of the tasks undertaken in field visit at Varanasi	15
Figure 2.9 Diagram depicting the world of Spirituality	17
Figure 3.1 Location of transect: ManiKarnika Ghat to Beniya Bagh; Source: Google Earth	20
Figure 3.2 Cross sectional view of transect: ManiKarnika Ghat to Beniya Bagh	20
Figure 3.3 People in motion	28
Figure 3.4 Compartmentalised spaces in Beniya Bagh	29
Figure 3.5 People's activity	29
Figure 3.6 Materials in motion	30
Figure 3.7 The evolving experiences along the transect ManiKarnika Ghat to Beniya Bagh	30
Figure 4.1 The points of interest in the transect	34
Figure 4.2 View of Dashashwamedh Ghat – bustling with activities even at night time	36
Figure 4.3 Dashashwamedh Ghat during the day	36
Figure 4.4 Laxmi Kund	36
Figure 4.5 Organizational Structure of Laxmi Kund	38
Figure 4.6 Section of Laxmi Kund	38
Figure 4.7 Organisational structure of Ram Kund	38
Figure 4.8 Section of Ram Kund	38
Figure 4.9 Section of Dashashwamedh Ghat	39
Figure 4.10 Organizational structure of Dashashwamedh Ghat	39
Figure 5.1 Kedar Ghat to Bhelupur water-work station	42
Figure 5.2 Methodology flowchart	43
Figure 5.3 Trail from Kedar Ghat to Water-works and locations of interviews conducted	44
Figure 5.4 Water supply system pipes running on the surface through the KedarGhat lanes	45
Figure 5.5 Different types of water standpoints in Gauriganj area	45
Figure 5.6 Vijaynagaram HIG society followed by Dhobi Ghat and Squatter settlement	45
Figure 5.7 Water intake pipe from Ghat, sedimentation tank and gravity filtration system	46
Figure 5.8 Creative community settlement involved in pottery besides the Sankuldhara Kund	46
Figure 5.9 Water supply - existing distribution system	48
Figure 5.10 SWOT analysis	49
Figure 6.1 Map showing the study area along the Assi Nala	52
Figure 6.2 Outline of the study methodology	53
Figure 6.3 Snapshots from the field visits	54
Figure 6.4 The Assi Nala and the kunds in the surrounding	56
Figure 6.5 Lolark Kund and the surrounding environment	57
Figure 6.6 Kurukshetra Kund (Plan); Adityapur Pokhra (Plan)	57
Figure 6.7 Various kunds and their associated usage	58
Figure 6.8 Accessibility, Spirituality & Income varies as the distance increases From River Ganga	59
Figure 6.9 Water level variation in kunds throughout the year	59
Figure 7.1 The Sandbanks	62
Figure 7.2 Sandbank Temporality (i) Dry (ii) Submerged	62
Figure 7.3 Activities	64
Figure 7.4 Changing Landscape	64
Figure 7.5 Farmlands	64
Figure 7.6 Collapsing Ghats (near ManiKarnika)	65
Figure 7.7 Cross sectional view	66
Figure 7.8 SWOT Analysis	66
Figure 7.9 Flywheel of activities	67

Preface

The report is a creation of an **intensive Urban Design, Urban and Regional Planning, and Infrastructure Engineering Collaborative Workshop on Project Varanasi** conducted together by the faculty and students from the Graduate School of Architecture, Planning, and Preservation (GSAPP), Columbia University, New York City, USA and that of the Ranbir and Chitra Gupta School of Infrastructure Design and Management and the Department of Architecture and Regional Planning, IIT Kharagpur. The collaboration can be treated as Phase II after the successful completion of an Intensive Workshop conducted on **Water Urbanism: Kolkata** during the year 2016-17.

The Workshop has been conducted in three stages, namely:

- I. **Stage I: November 2 – 6, 2017**, comprising of an initial visit by representative faculty team of GSAPP, Columbia University and IIT Kharagpur to Varanasi for finalising sites and locations of intervention. During this visit, meetings were conducted with IIT BHU, BHU authority and faculty and Local Municipal and authorities.
- II. **Stage II: January 6 – 14, 2018**, comprising of **detailed field visits, primary reconnaissance surveys, and secondary data collection in Varanasi**. It also involved meetings and discussions with a number of stakeholders and decision makers from Varanasi Municipal Corporation, Varanasi Development Authority, etc. and experts from institutes like Jnana-Pravah: Centre for Cultural Studies and Research, Design Innovation Centre, IIT (BHU) and (BHU). The exercise is a part of the a) Seminar and Simulation Laboratory component of RCGSIDM, IIT Kharagpur and ARP, IIT Kharagpur and b) the Planning Development Exercise of ARP, IIT Kharagpur
- III. **Stage III: May 1 – 3, 2018**, End-term Review and Reciprocal Workshop in Columbia University and IIT Kharagpur in attempt to arrive at unique results and interpretations of Urban Design, Planning, and Infrastructure Engineering innovations in Varanasi.

Bhargab Maitra

Head, Ranbir and Chitra Gupta School of Infrastructure Design and Management;
Professor, Department of Civil Engineering
IIT Kharagpur

April 2018

The study has been conducted by dividing Varanasi into seven transects in total, out of which six transects start from the six different ghats and extend outward and the seventh one is across the River Ganga. The seven transects are as follows:

1. Journey along the Varuna: **Adi Keshav** Transect
2. Urban Water Culture in Transition – Spirituality to Economy A study of Practice Pockets along **Panch Ganga** Transect
3. Flow, Flux and Temporality as design inspiration: **ManiKarnika** Transect
4. Exploration of Local Social Systems in the city of Varanasi: **Dashashwamedh** Transect
5. Social Scale of Water: **Kedar** Transect
6. Social and physical transformations of urban landscape around water use and challenges ahead: **Assi** Transect
7. The Nomadic Landscape – **Sandbanks** of Varanasi

We would like to express our special thanks and gratitude to Dr. Partha Pratim Chakrabarti (PPC), Director, IIT Kharagpur and Mr. Ranbir (Ron) Gupta, alumnus and mentor for their constant support and motivation.

We would also like to thank the faculty team from GSAPP, Columbia University, namely, Prof. Kate Orff, Prof. Geeta Mehta, Prof. Julia Watson, Prof. Dilip Da Cunha, and Dr. Sytse de Maat for their involvement and collaborative efforts.

The team from IIT (BHU) Varanasi and Banaras Hindu University including, Prof. Rajeev Sangal, Director IIT (BHU) and faculty members specifically, Dr. Amrita Dwivedi, Dr. Swasti Mishra Raina, Dr. Ravi Shankar Singh, Dr. Ankit Gupta, Dr. Devender Singh and Dr. Manish Arora, who hosted the teams in Varanasi and supported in every possible way.

We hope this earnest effort by our scholars and students on the Great City of Varanasi will go a long way with good grounding and publications.

Joy Sen

Professor and Head, Department of Architecture and Regional Planning;
Joint Faculty, Ranbir and Chitra Gupta School of Infrastructure Design and Management;
IIT Kharagpur

Chapter 1

Journey along the Varuna: Adi Keshav Transect

Arpit Gothi, Debanjan Kayal, Vaibhav Dhiman



“Happiness is a journey and not a destination.”

-Buddha



1.1 Introduction

Varanasi got its name from the rivers Varuna and Assi within which the city thrived along the holy river Ganga. The rural setting with urban facilities is what sets this transect along the Varuna apart from other parts of Varanasi. The Varuna which was once the life source for the surrounding villages has now become a narrow canal affected with polluted waters. The main aim of this study is to make the river a part of people's life and appreciating an amalgamation of rural and urban lifestyle rather than changing them.

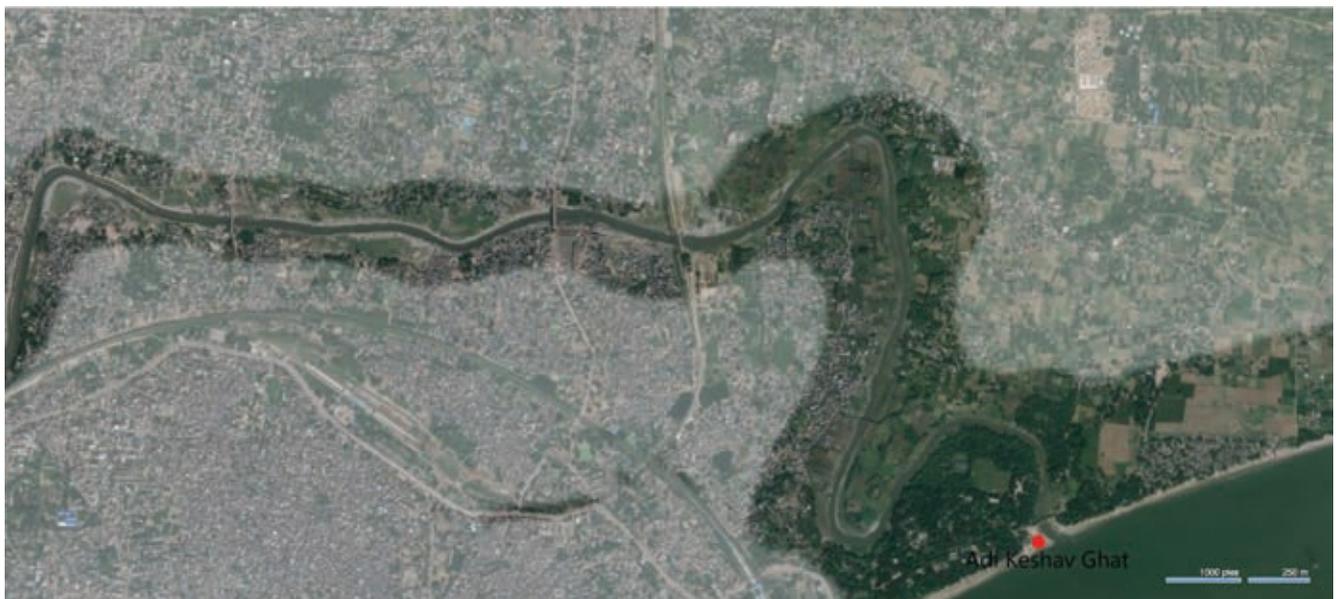


Figure 1.1 The Transect (source: Google Earth)

1.2 Objective

The journey throughout the given transect was a series of transition from city to village, farmland to built structure to riverbeds, softscape to hardscape & temporal to static. We started our journey from the Adi Keshav Ghat into Saray Mohana village, to the various kunds across the several bridges that came along the aforementioned transect

- To stop making assumption of an urban/rural divide and embrace a gradient of productive & material landscape
- To make Varuna River a stewardship system and an ecological infrastructure

1.3 Methodology



1.4 Timeline of the field studio

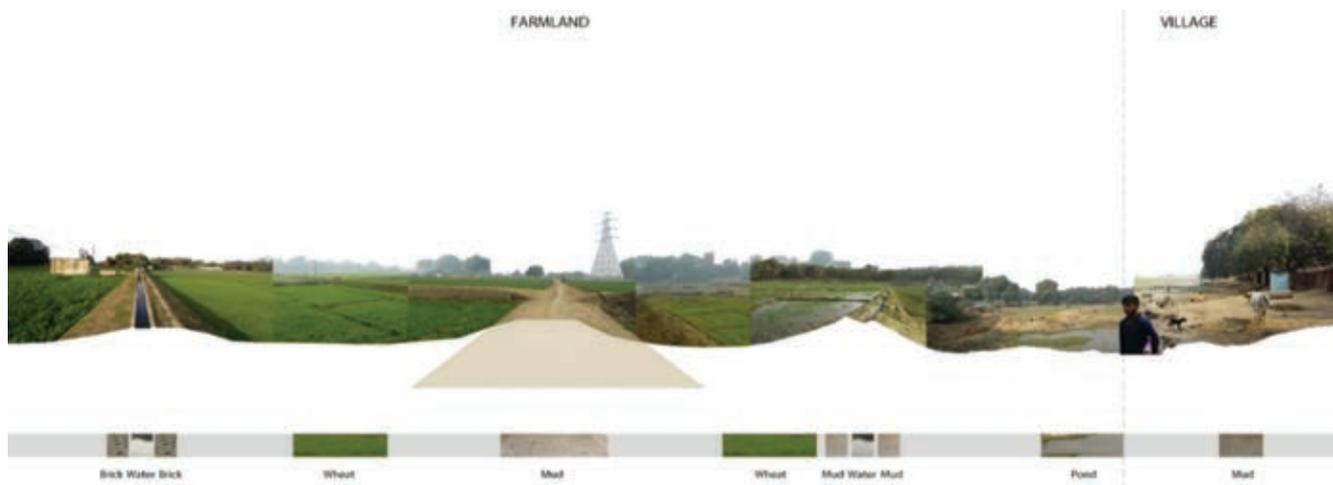


Figure 1.2 Transition from farmlands to villages

As depicted in the section above, we observed here the transition of farmlands into villages. Saray Mohana village is unlike our perception of a rural one, while most of the houses are 'pucca' in nature, some of them even have graffiti done by a local artist. The unique mixture of nature and man-made structure puts it beyond our clichéd classification of rural and urban. The village has all the amenities of an urban life i.e. electrification, water supply, sewerage system etc. but sustains on agriculture and local handcrafts.



KUND



Figure 1.3 Transition of kunds from soft-scape to hard-scape

We started our journey from Adi Keshav Ghat in search of 'kund'-s (i.e. water tanks) along the transect. The first thing that we spotted was a wet field which gave us the notion of a primordial kund. The one observation which struck us the most was, kunds which had a 'natural' setting were still used by the surrounding population for their daily use/livelihood while those that had a concrete or more formal setting were either used for dumping waste or had no significance to the surrounding households as they have no stakeholders.

Opportunity

Artificial aeration in order to increase dissolved oxygen & biological activities to improve quality of water by creating wider water channels to increase the surface area. This can be done by making two step-cuts along a wider section of the river and the excess space available in the non-monsoon period can be used in a variety of temporal mixed use.

Also its recommended not to construct any permanent embankment but to let the natural flora and fauna thrive as it increases the rate of purification and rather use a porous material like perforated concrete to bind the embankment. Bio-remediation uses naturally occurring bacteria, fungi or plants to degrade substances that are hazardous to human health or the environment.

BRIDGE

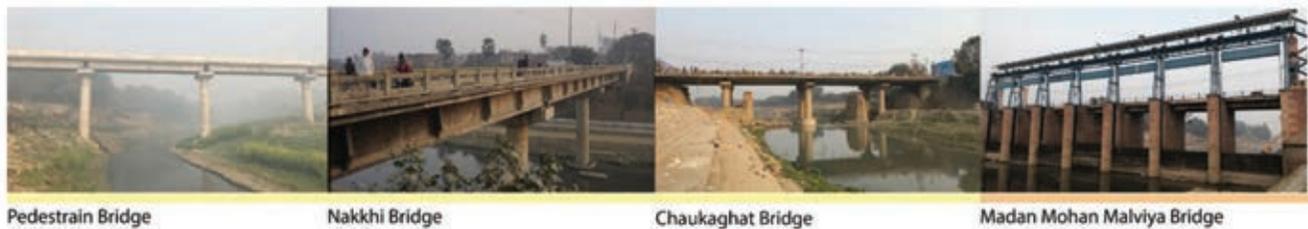


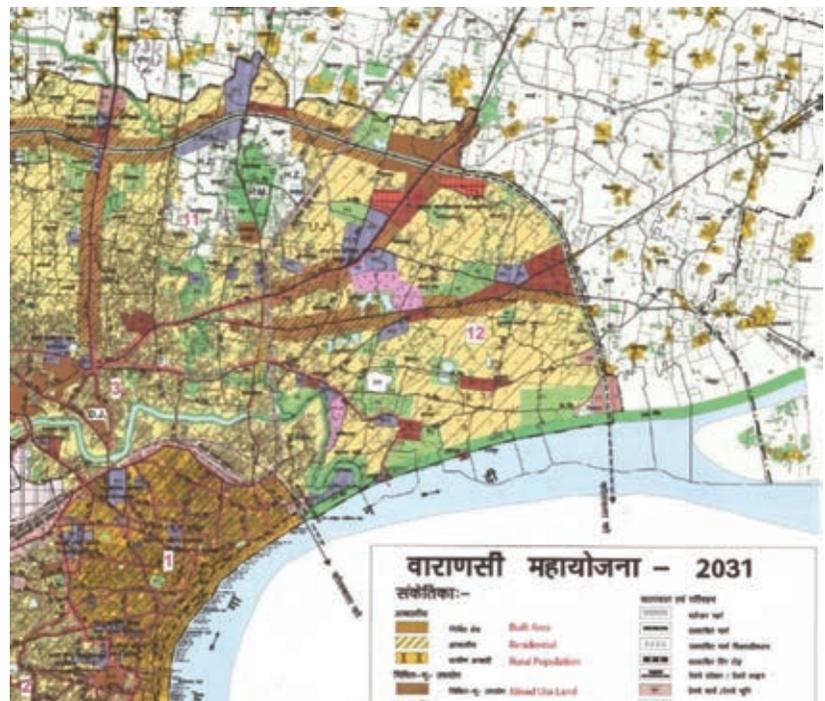
Figure 1.5 Bridges along River Varuna

Along with the rivers, the multiple bridges along River Varuna as shown in the above image can be modified as 'Gates of Purification'. For example an algal screening combined with anti-toxic agents to nullify the harmful elements in the water so that when it finally reaches the confluence, it doesn't affect the water quality of Ganga. Natural dyes or more environment friendly colors that can be treated through the natural processes to be made mandatory as these are the main source of intoxicating the water quality.

Threat

The main threat is from the modern planning practice that is prevalent in Varanasi which does not take into account the actual ground truths and relies on GIS and satellite mapping which often gives a wrong interpretation. This is very evident from the Varanasi 2031 Master plan which disregards the actual ground scenario.

For example, it basically made a ring road around the Saray Mohana village which has mostly concrete houses, but it ignored the fact that the livelihood of those people depends mostly on agriculture and local handlooms. As a result if development along this master plan is carried out it will not only lead to people changing their occupation and ultimately serving the higher section of the society that will come up as a result of transit-oriented development (TOD) along the aforementioned ring road, but also affect the natural ecology of the entire region.



1.6 Conclusion

Finally we can conclude from the above report that if the following changes are made, as mentioned below, it would lead to a better and more accommodating future for Varanasi and it can become a place one looks forward to visit, not just for its spiritual essence but also for its scenic beauty and unique symbiosis of man and nature working together for a better future.

- The kunds need some form of stakeholders including that includes the local people to give them a sense of responsibility in preserving its sanctity and water quality.
- Classification along urban and rural system needs to be revised and interventions should be done at micro level to the prospect of each area rather than dictating an overall general guideline.
- To stop the present concretization of embankment of Varuna and Rathe make the river shallower and wider into two step cross-section to increase the rate of aeration and include the natural flora and fauna so that detritivores can break down the wastes and other toxic elements faster before the river meets with Ganga.
- To make the bridges into purification system by placing an algal screening combined with anti-toxic agents to nullify the harmful elements in the water.

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“The city illumines truth and reveals reality. It does not bring new wonders into the scope of vision, but enables one to see what is already there. Where this eternal light intersects the earth, it is known as Kashi.



Diana L. Eck

Chapter 2

**Urban Water Culture in
Transition – Spirituality to
Economy : a study of Practice
Pockets along Panch-Ganga Transect**

Aarsi Desai, Naushad Ahmad, Vidhu Pandey



*“Annad bhawanti bhutani prajanyaddanna sambhawa
Yegyad bhawanti prajanyo yegya karmasamudbhawa”
-Bhagawat Gita*



2.1 Introduction

This verse from Bhagawat Gita is one of the central themes of Sanatana Dharma. It summarizes that water is vital for all living beings and every element on Earth. Animal kingdoms are modified mass of plant product that is possible in the presence of water. Precipitation is the source of fresh water so all green business should be centred on sustainable Water Resource Management.

There is an increase in the ecological awareness, probably because the consequences are very evident in the recent years. Water, and the issues that surround its use, are very complex, and hence it cannot be dealt with in isolation. The problem areas can be simplified in three broad sections: too much water (floods), too less water (droughts), or too bad (poor quality, pollution). The problem of Varanasi is the pollution and hence the poor quality. Different governments, political parties, non-profit organizations, etc. have attempted to address the issue with an array of approaches. However, the solutions were very superficial; the planner taking position of an outsider – a spectator, the situation lacks the vision from the perspective of an inhabitant, which might tackle the problem effectively. If the government and donor agencies continue adopting accepted capitalism and inclusive green growth path to address the water scarcity then the outcome will always be limited to paper and documents.

The sense of belonging plays a very important role in the sustenance of a place; it encourages responsibility and obligation amongst the users concerned. There is a strong disconnect between the planner and beneficiaries. The religion essentially is a medium to bring this association hence reinforces the values of ecological responsibility interwoven in the form of rituals. However, religion today has come far from its initial disposition. It has become the exact contradiction of what it initially constituted. The rituals and religious activities have rendered the river saturated with bio-waste, uninhabitable for the native species. The population pressure has proven very costly for the river itself due to the constant influx of sewage in to the river system. The holiness has been defied every day and the river is treated as a waste bin and packaged as a religious act.

2.1.1 Panchganga Ghat

The Panchganga Transect is located on the north of Dashashwamedh Ghat. It is believed that five streams meet here and hence the ‘panch’ or five being associated with its name. The peculiarity of the ghat lies in its relatively docile nature, platforms at different levels, multi-layered niches, ‘akash-deep’ (i.e. sky lanterns) and steep ascend to the mosque. The ghat is located near residential area and hence exhibits a very different set of activities. It is less commercialized, and caters mostly to the adjacent neighborhoods. The peculiar nature of the ghat might be attributed to the fact that it houses two places of worship - Bindu Madhav Temple (Hindu) and Alamgiri Mosque (Islamic) in the same vicinity.



Figure 2.1 Panchganga Ghat from the river.



Figure 2.2 A sketch of Panchganga Ghat highlighting the bamboo poles for 'Akash-deep' festival.

The famous 'Akash-deep' i.e. Sky Lantern festival takes place on Panchganga Ghat in October in the memory of ancestors. The reference goes back to the time of Mahabharata when the lanterns were lighted for the first time in memory of the lives lost in war. The festival is also celebrated in the memory of Kargil War martyrs. The significance is deeply engraved in cultural heritage and practices. This is one of the practices which do not harm the ecology.

The transect included narrow residential alleys with occasional commercial corners. The social infrastructure was intrinsically embedded in the fabric. The major practices pertaining to the transect were studied in detail. The practices studied are as follows

2.1.2 Kabir Math

'Kabir Math' is a place of historical importance dedicated to saint-poet Kabir and his preaching. Kabir was born here, and hence the 'math' is one of the several places associated with him in the City. Kabir believed in judicial use of resources and equality. The legacy of Kabir is dying slowly in chaotic Varanasi. One of the saints said that the dependency on cultural spaces has reduced due to several reasons. Earlier these cultural spaces served as a hub for recreation, however, today people have lost the sense of belonging and turn to theatres and other western ideas of recreation. Another reason is the increasing gap between today's youth and their sense of belonging with ancient cultural heritage.



Figure 2.3 Kabir Math

2.1.3 Alamgiri Mosque

It is believed to have been constructed by Emperor Aurangzeb in 17th century CE. The mosque is located in a Hindu neighborhood. It is a place for gathering especially during the Friday prayers. The significance of water is evident in the practice of ablutions – spiritual cleansing before one appears before the almighty. In earlier days, the devotees would go down to the Ganga and perform this activity; however in the current times pumping made this activity restricted to the mosque premises.

2.1.4 Peeli Kothi

The Peeli Kothi area in Varanasi houses weaver communities. These are Muslim majority areas, where the entire families are involved in the weaving activities from generations. It is a skill-based profession and the 'sarees' (the end product which is draped by women as an ethnic attire) hence prepared in handlooms are of superior quality. The advent of technology has also introduced power looms in the business, the production of sarees has become faster but the sarees prepared with handlooms are still considered the best in quality.

Banarasi saree is the only major industry in the vicinity of city. It is decentralized and operated in a traditional family-based system, where the ground floor acts as a work place whereas the upper floors are meant for residential purposes. However, the younger generation is refraining to carry out the family business and venturing into other streams which they seem as more profitable.

2.1.5 Company Garden

The Company Garden is named after and established by the East India Company. The compound houses a court room that dates back to the British times. The ground serves as a place of gathering for the neighborhood communities with it being the only large open space in 5 km radius. The compound has scope for recreational activities for all age groups. The area also has other colonial structures which act as government offices in current times.



Figure 2.4 Sketch of Alamgiri Mosque



Figure 2.5 A handloom weaver's work space



Figure 2.6 Court room dating back to the British Raj

2.2 Objective

What if the Spiritual Practice and Ecological Restoration Practice could be aligned to foster urban landscape transformation and public health?

The objective of the paper is to identify and discuss the common thread joining all the above structures and their importance. The extensive detachment of public upon the advent of government interventions on the river has been the focus of this study.

2.3 Framework

The flowchart shows the methodology followed in the paper. The peculiar practices in the transect were identified and analyzed on their strengths, weaknesses, opportunities and threats. The common thread joining them all is the river Ganga and its importance in cultural associations, traditional history and settlement systems around them. The water has been degraded manifolds in recent times especially during the festivals. The paper tries to reason the detachment of river in spite of religious and cultural associations.

British interventions and population pressure have been major reasons for these fallibilities. However, the government agencies have tried to address the issue from a half-hearted perspective. The constant extraction and the exploitation resulted in loss of cultural essence. The lack in sense of belonging results in residents trying to exploit the river and extract maximum economic benefits from this resource.

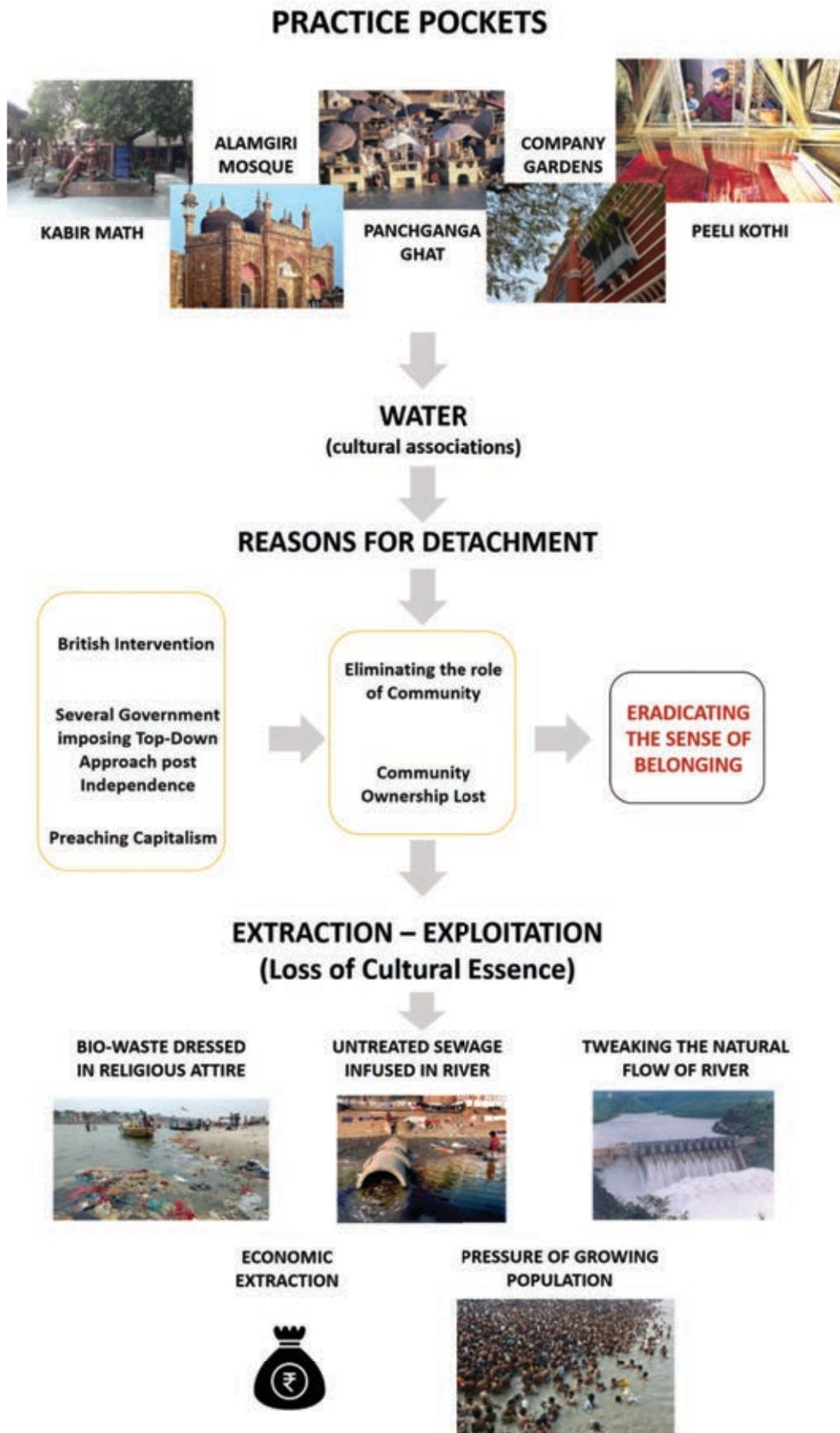


Figure 2.7 Framework of Analysis



Figure 2.8 Methodology of the tasks undertaken in field visit at Varanasi

2.4 SWOT Analysis

Practice Pockets	Strength	Weakness	Opportunities	Threat
<i>Kabir Math</i>	responsible spirituality	lost significance	spiritual correction centre	forgotten legacy
<i>Panchganga Ghat</i>	multi-cultural roots	cattle nuisance	podium for annual akash-deep festival	waste accumulation
<i>Company Garden</i>	Mandakini Kund	gated public space	trigger point for awareness activities	transfer of ownership
<i>Peeli Kothi</i>	traditional skills	power-looms	monitored vocational commercial centre	youth unwilling to learn skill
<i>Alamgiri Mosque</i>	monumental backdrop	limited footfall	religious centre - madarsa	degradation of structure if not maintained

2.5 “So-called” Thresholds of Progress

The thresholds of progress – development has taken its toll on the river and the quality of its water. The idea is to resolve the issue by looking in minute detail rather than solve it on a superficial level.

2.5.1 British Legacy of India's River Management

The worship of the rivers in India has been reduced to a ritualistic process that people follow only because they are told that it will benefit them. A man who conducts a ritual or a ceremony on the ghats of Ganga in Varanasi will not fret to spit on the same ghat after finishing the ritual. This is the dichotomy of 'worship and disrespect'.

The introduction of property rights by the British colonial regime did the most irreversible damage to the ethos and the consciousness of the Indians. The regime made all the water bodies the state's property. That is the rivers, lakes and ponds which was common property before, now no longer belonged to the village or its people who inhabited their banks. When rivers, lakes and ponds were common property, the villages used to maintain these assets by coming together as a community and taking turns to maintain them. This community effort established an intrinsic connection between the river and its people.

2.5.2 Ecological Degradation

The ecological parameters were overlooked in the world, even more so in developing nations until they reached a saturation point. The awareness in the late 20th and 21st centuries has brought about a different perspective before the planning authorities, the reason being the haphazard development and controlling authority. The water of Ganga is highly contaminated, due to disposition of various elements in water. There is a lot of biodegradable waste deposited every day in form of rituals in the river, especially flowers, and other offerings to the holy river.

2.5.3 Increase in Population

Within 75 years, India's population will increase nearly four-fold from 361 million in 1951 to 1,394 million in 2025. That is an enormous increase in water demand in a very short span of time. Although India occupies an area of only 3.29 million km², forming 2.4% of the world's land area, it supports over 15% of the world's population. In other words, India supports about 1/6th of the world population while comprising of 1/50th of the world's land and 1/25th of the world's water resources. Per capita availability of water in India has declined by 70% in the period 1951-2011 to a level of 1,545 cubic meters in 2011. This is expected to decline another 15% in the period 2011-2025 to a level of just 1,341 cubic meters. At this rate, we are heading for a change from being a water-stressed country to a water-scarce country. What is desirable at the national level is a holistic policy framework, focusing on river basin management that combines not only abatement of pollution and conservation but also ensures sustainable livelihoods for the riverine communities.

2.5.4 Pollution and other forms of River Exploitation

It is true that pollution is one of the major reasons why life in and around rivers are perishing. Based on the long-term assessment of water quality data, 275 rivers out of 445 rivers monitored under National Water Monitoring Programme are identified as polluted. The sources of pollution to a river are: domestic sewage from urban and rural areas, non-sewage drainages, wastewater from agricultural facilities, and industrial wastewater / effluents. Wastewater generation is proportional to the amount of water consumed. Out of the total fresh water used in India, irrigation accounts for nearly 78%, followed by domestic use 6%, industries 5%, power development 3%, and other activities including evaporation losses, environment and navigational requirements around 8%.

2.5.5 Urban Sewage

Domestic sewage is one of the most obvious and visible forms of pollution to rivers. Urban settlements in India contribute 61,754 MLD of which 38,791 MLD goes untreated, while the cumulative sewage treatment capacity of the nation is 22,963 MLD. According to Central Pollution Control Board, the untreated 38,791 MLD goes directly into water bodies - rivers or ponds or lakes.

2.5.6 Spiritual Capitalism

Though the concept of natural capitalism is praiseworthy, implementation becomes doubtful without the incorporation of spirituality. In the society like ours, spiritual belief is of prominent importance; hence the role of almighty in natural capitalism can have more practical implications. Present accounting practice could not identify the real owner and/or donor of those capital bases, because the subject is related with spirituality rather than natural science.

Arguments for a cultural approach to conservation address two questions. First, “What are the values we wish to conserve?” This reflects concerns over the narrow perspectives expressed in current conservation theory and practice and will help to clarify the non-material objectives of conservation, and will contribute to the evolution of new conservation approaches. Second, “How can we achieve conservation?” This question speaks to the fact that the biological diversity that defines current conservation objectives continues to decline, demonstrating the need for new approaches that will improve conservation delivery.

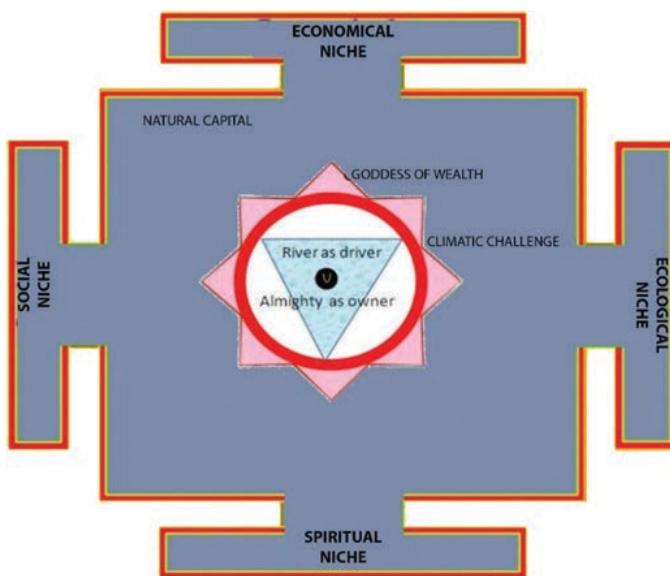


Figure 2.9 Diagram depicting the world of Spirituality

World of spirituality is meaningless when one looks from economical window, but material achievement is less significant when observed from the spiritual. To maintain the balance between economy and spirituality is the task of social and environmental window. Natural capitalism comes from three windows, economical, ecological and social and often discards the spiritual window. As a result, our rivers, forests and other natural resources are dismantled and corrupted. With the blend of these four mixtures, we can expect to add the value to our water sources and also incept the concept of self-motivation to preserve as well as utilize them.

2.6 Conclusion

- The idea of integrated water resources management combining scientific and technical based approach is very promising because of public participation, which can result in renewal of public participation towards the care of ecosystem. However, this approach lacks strong ethical basis, sufficiently rooted in the society. Inclusion of spirituality will add value to the water resource management.
- Development and environmental protection cannot be done without combining faith, spiritual approach and science. Spirituality helps in developing self-monitoring and control mechanism which is also a low-cost mechanism, where social cognitive theory works more effectively.
- Spiritual capitalism can further strengthen the holiness of these rivers along with the development of inclusive business that can emancipate the standard of the people dependent on water culture.

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Chapter 3

**Flow, Flux and Temporality
as design inspiration:
ManiKarnika Transect**

*Abhishek Aher, Abhishek Yadav,
Anuradha Chakrabarti*

3.1 Introduction

ManiKarnika, the burning ghat as it is popularly known, is a bridge between life and moksha where death reigns. The magnificence of the charred facade housing the eternal fire welcomes visitors of this ghat to a spectacle of death. Here, incessant smoldering turns mortal remains into ashes that thereby flow into the holy Ganga. The Ganga is an outlet for the ghat where the last remains (ashes and other puja paraphernalia) flows down along with beliefs that the deceased are relieved from the cycle of birth. Fire and water are celebrated as an event in this ManiKarnika Ghat. Here, the dynamic flowing Ganga is at its epitome of piousness that goes beyond the confines of the Ghats to embrace the entire city and near and far regions. Dialectically, the same Ganga and the ManiKarnika Ghat situated on it also acts as an inlet of belief, livelihood, politics, exchange and interaction spanning across political boundaries, both national and international.



Figure 3.1 Location of transect: ManiKarnika Ghat to Beniya Bagh; Source: Google Earth



Figure 3.2 Cross sectional view of transect: ManiKarnika Ghat to Beniya Bagh

Succinctly, flow, flux and temporality characterize the transit between ManiKarnika Ghat and Beniya Bagh. Every year there is an influx of pilgrims and tourists that the city has neither the infrastructure nor the resources to support. A complex mechanism of materials in transition, people in motion coupled with their activities, spaces they appropriate that add to the overarching concept of Flow, Flux and Temporality.

This transect encompasses a tightly woven urban fabric with markets, Mandis, a constellation of communities involved in different economic activities and many structures of mythological importance, especially, the ManiKarnika Ghat, with the popular belief that a dead human's soul finds salvation (moksha), when cremated here. The Hindu mythology has stories about its birth as a portal to new life, based on divine characters like Vishnu, Shiva and Parvati. ManiKarnika Kund is another important Hindu religious site in the transect which is associated with salvation.

The transect spans across approximately 1km in length and 250 m in width. It starts from the ManiKarnika Ghat through narrow lanes which are filled with the chants of 'Ram naam satya hai' dissipating in the air along with the 24 hours incense stick fragrances, passes through busy streets of Dal Mandi market piled with cheap goods and essence of gastronomic delights of Varanasi, to finally ending up at Beniya Bagh which provides shelter and economy to some of the nomadic communities in the area.

3.2 Objective

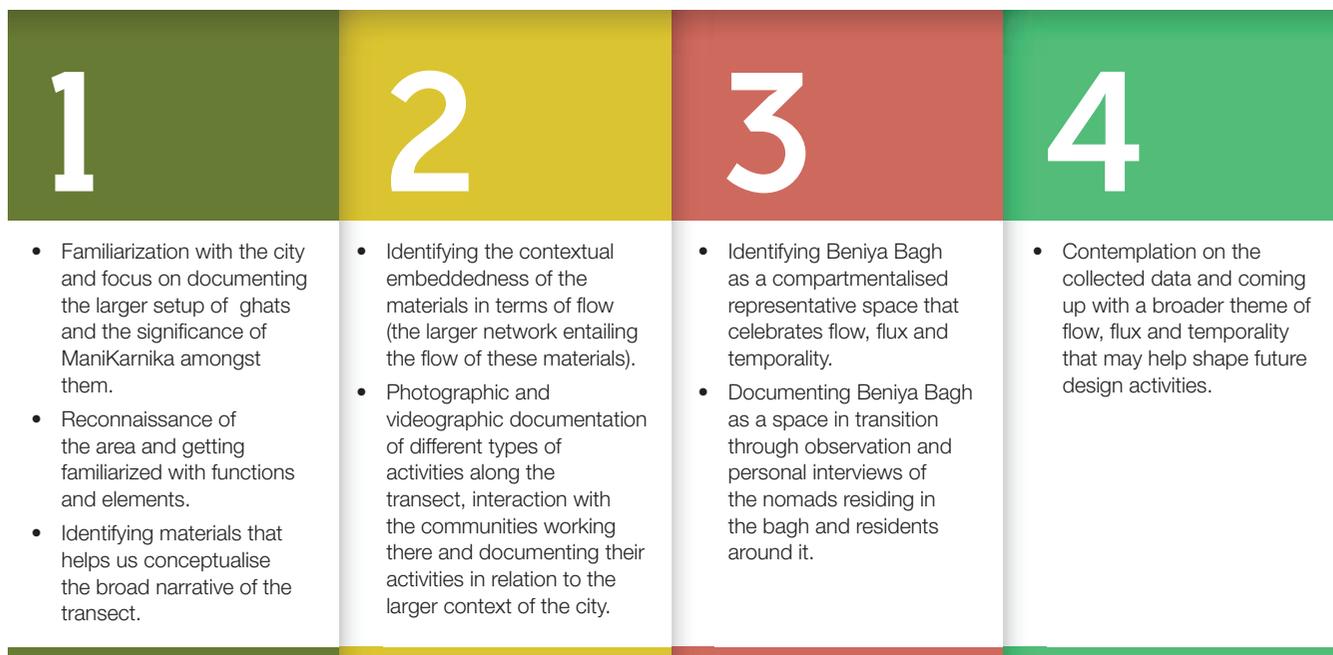
The formulation of the objectives for this part of the study emerges from a principal 'what if' question:

The ManiKarnika-Beniya Bagh transect is composed of spaces in transition, animated by flow of people, material and intangible elements that encompass an overarching network of belief that has been appropriated by economic sensibilities of locals and migrant communities. Therefore, What if, flow, flux and temporality become a driving force of design practices?

This leads to the objective:

Identifying people and material in motion in and along the transect, how their inflow and outflow have carved identifiable representative spaces in the transect; the associated economic activities as well as their physical footprint in the urban fabric with respect to the water bodies which is helping them in many ways to survive.

3.3 Methodology



3.4 Timeline of the field studio

The morning sun coupled with chaos and dust rising from heavy ongoing construction near the railway station greeted us to the holy city of Varanasi. The entire IITKGP and Columbia team visited Jnan Pravaha where we were warmly received by the host and what followed was a cascade of information, in the form of talks, on the history and culture of this divine city. We were briefed about the historical setup of the study area and Varanasi followed by talks on ongoing projects by historians, professors and scholars from Jnan Pravaha, IIT BHU, IIT Kharagpur and GSAPP, Columbia University. Thereafter, a sumptuous lunch awaited us in the lawn followed by the formation of seven groups, including students from both the institutes, for studying seven transects for the field studio. Group-wise discussions were organized with the studio co-ordinators from both the institutes where we were briefed about the transect and its potentials.

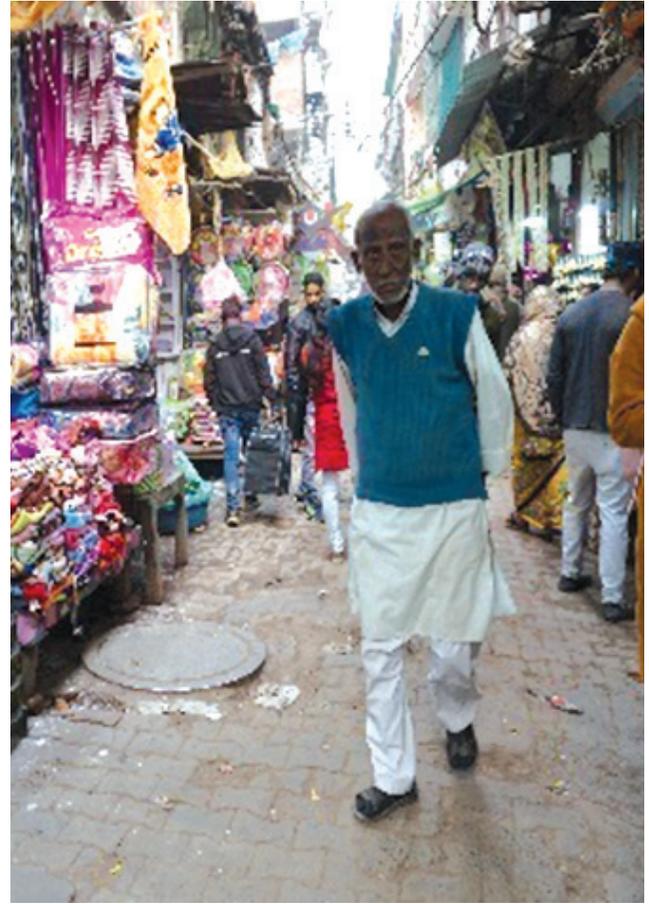


The morning started with a formal discussion about the approach towards the field studio at Banaras Haveli with the group (Transect-3 ManiKarnika Ghat). Walking all the way from Assi Ghat, documenting the changes we reached Manikaranika Ghat in the afternoon. Post lunch the group visited Beniya Bagh, situated at the end of the transect, for a perception study. This was followed by a desk-critique with the studio co-coordinators where we shared our experiences and observations and received constructive feedbacks for progress.



The next stay started with exploring the narrow lanes that forms the conduit connecting Manikarnika Ghat with Beniya Bagh. The entire route was documented by the team coupled with ad hoc interviews with shopkeepers along the way. It gave us an understanding as to how dynamic the flow of activities are in the lane. There was an observable mismatch between activities at the end and the starting points of the transect. There was limited symmetry in the type of activities in the lane restricting the establishment of a flow or interrelationship. This is also because of the lane we selected amongst the many lanes connecting Manikarnika Ghat and Beniya Bagh. The day ended with reporting to the professors at Banaras Haveli about the site visit.





The entire next day was spent in Beniya Bagh by the team where we interviewed the nomads who squatted the Bagh in an ad-hoc way. The compartmentalization of the Bagh was documented and the activities in and around the Bagh was studied with precision. With special permission, the team got a chance to visit the residence of the buildings abutting the Bagh. This visit helped us in constructing a timeline of activities in and around the Bagh. That, in turn, helped us to formulate the theme that emanated from the understanding how flux, flow and temporality shapes urban spaces through appropriation by various actors.

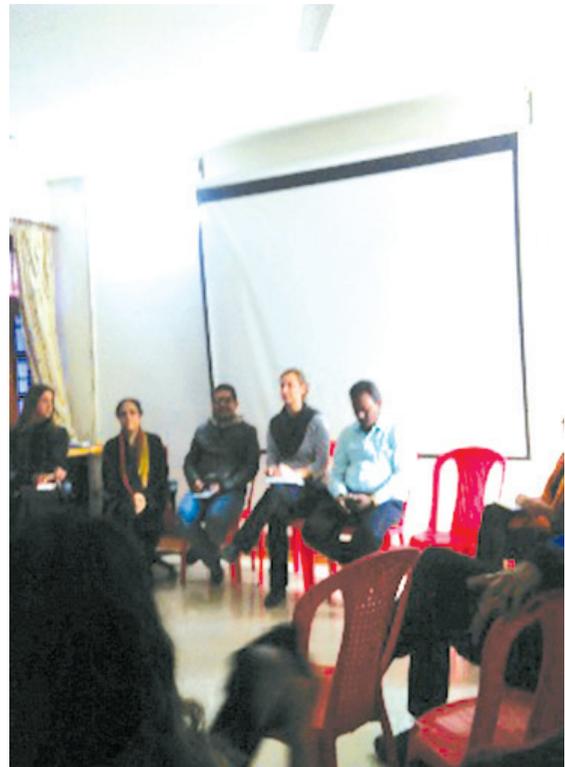


The next day was a reprise from the continuous tedious field work that the groups have been conducting. Students, accompanied by the co-ordinators and faculty members, visited the Dhamekh Stupa and Sarnath temple. Historically, Dhamekh Stupa is one of the most famous Buddhist Stupas. We also indulged in exploring the fields near Kapildhara Kund and visited the Mahadev temple at Kapildhara.



The next day was the production day before the final presentation that marked the closing of the field visit. Rigorous exchange of ideas and constructive arguments were the highlights of the day. By the end we were in some position to show the progress of the work to the studio co-ordinators in Banaras Haveli.





The teams presented their works followed by critical feedback from the panel in the IIT BHU Guest house that followed lunch and a picture session.

3.5 Evolving Experiences

The evolving experiences from the field visit have been depicted in a pictorial format. The flow of people, pilgrims and nomads to different corners of the city for different activities has been conceptualised under an overarching theme that is belief. A wide array of activity happening in the transect makes it a microcosm of vibrant economy. Different community residing in the transect gives it a nature of true microcosm.



Figure 3.3 People in motion



Figure 3.4 Compartmentalised spaces in Beniya Bagh

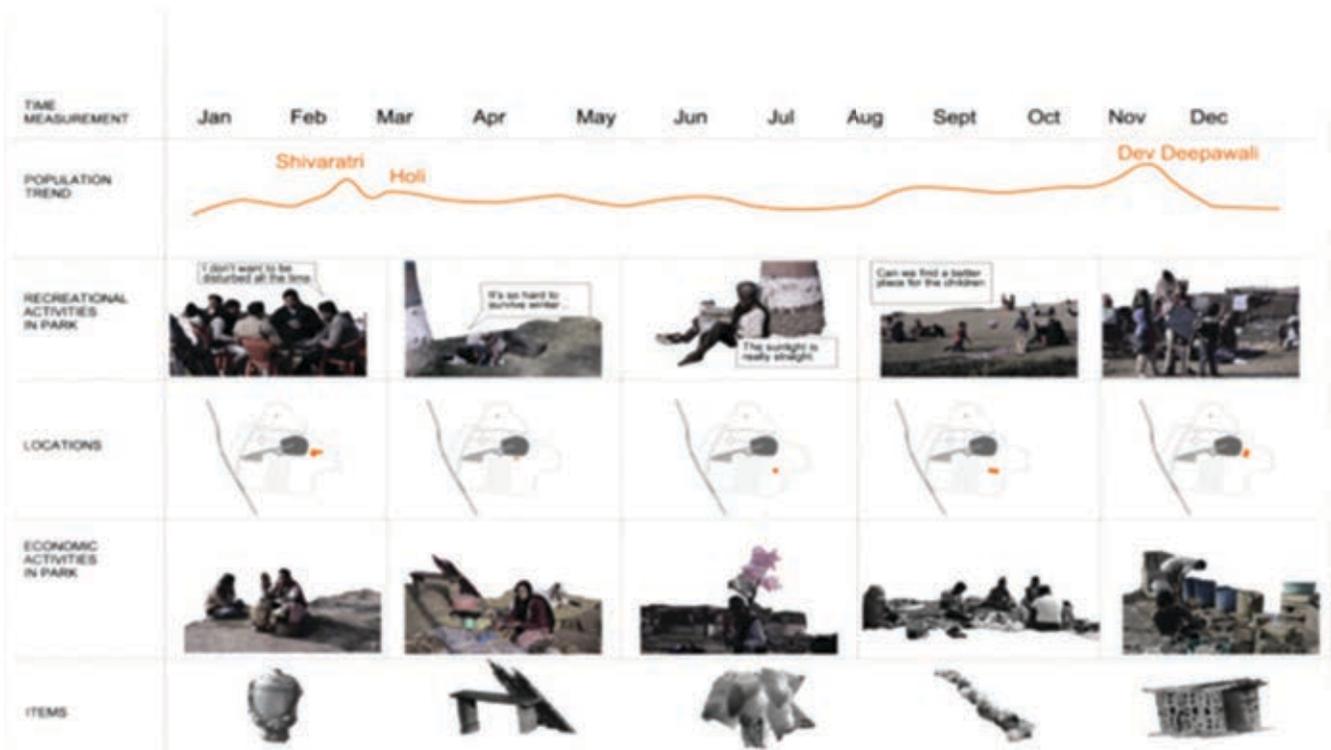


Figure 3.5 People's activity



Figure 3.6 Materials in motion

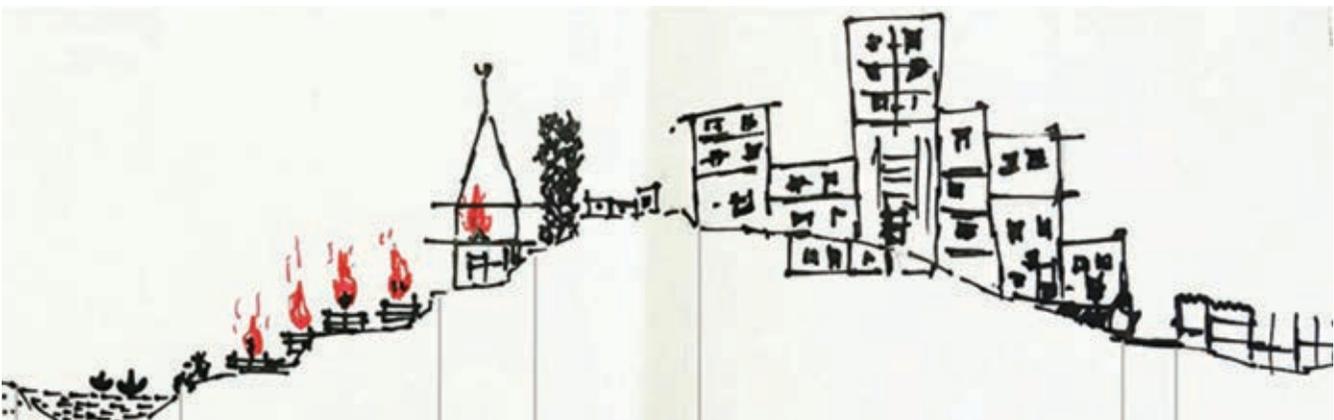
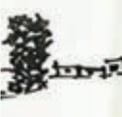
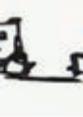


Figure 3.7 The evolving experiences along the transect ManiKarnika Ghat to Beniya Bagh

Activity	Communication	Cremation ground	Eternal fire	Ancillary shops	Residence and commercial	Road	Bagh
							
Driving force	Belief	Belief	Belief	Burning paraphernalia	Conduit	Functional linkage	Community belief
Community	Boatman	Dom	Dom's family	Locals	Locals		Locals, nomads
Elements/material	Water, ash, flowers, clothes	Fire	Eternal fire	Wood, shroud, sandal wood, ghee	Miscellaneous		'Rudraksh' (i.e. bead for rituals) and 'kasturi' (musk)
Space	Flowing, Outlet, inlet, Purification, pollution, livelihood	Everyone is turned to ashes. Livelihood, belief.	Belief, livelihood, culture	End point of materials (wood, shroud). The point that interconnects livelihood	Interconnection, exchange. Very different in character from the spaces it connects	Flow of people and material	Compartmentalized by activities, belief. Appropriated space
Flows	Belief, ashes, corpse, sewage and garbage	Corpse, people	Belief	Material used in burial process (in and out)	Goods, locals, tourists, information	People, material	Nomads, locals, material-rudraksh, kasturi, activities

3.6 Conclusion

The concluding remarks from the study would be the following:

- Going beyond the confinements of the transect, a holistic view of the city in terms of flow, flux and temporality needs consideration. This study has the potential to narrow down to physical and policy level intervention based on the quantum of flow and temporality of the activities across it.
- The entire transect is composed of spaces in transition which are constantly adjusting themselves to accommodate changes.
- Beniya Bagh has immense potential in reimagining the way we conceive space. Open spaces as such are the most imaginative and inclusive spaces, not only because they defy control but also in the way how these spaces reflect the true spirit of the city.

Design backed by policy interventions needs to be taken up which are in line with the degree of flow and flux and keeps reconciliation of the diverse socio-economic background of the population. The designs require accommodating the marginalized in not only the economic domain but also giving them deserved spatial recognition and dignity.

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*“Enlightenment, and the death
which comes before it, is the
primary business of Varanasi.”*



Tahir Shah

Chapter 4

**Exploration of Local Social
Systems in the city of
Varanasi: Dashashwamedh
Transect**

Jyoti Kiran, Deepanjan Saha, Vivek SV

4.1 Introduction

Varanasi is one of the oldest inhabited cities in the world. The city, since its inception, grew organically - like most of other Indian cities; which in turn has led to a very congested and dense core in current times. The city might appear very chaotic and unorganized when seen through the lenses of set parameters of “city planning and design”; but the fact that the city still functions, and even keeps growing, challenges and defies such initial appearance. The study tends to explore the inherent systemic logic and even argues against “too much” external interference.

Dashashwamedh Ghat, by river Ganga, is one of the most visited spots in Varanasi – both by pilgrims and non-pilgrim tourists (i.e. visitors who come for non-religious pursuits, henceforth simply called tourists). The transect stretches from Dashashwamedh Ghat in the east for about two kilometers inland in the west. The stretch is majorly along the road between Dashashwamedh Ghat and Godoulia intersection, and further along Luxa Road till Guru Bagh intersection. Located north of Luxa Road are the three water tanks (or, kund), namely Suraj, Laxmi, and Rama Kund, which are significant sites in the study area.

- Dashashwamedh Ghat: It is one of the most important tourist and pilgrim spots in the city because of the legends attached to it and also because of its proximity to the main shrine of Kashi Vishwanath. ‘Ganga aarti’ – a spectacular ritual held every evening at the Ghat - is a major attraction for tourists and pilgrims alike.
- Kashi Vishwanath Temple and lane: The approach lane (or, gully) to the temple is predominantly commercial in nature and is a high security zone. The presence of a mosque next to the temple makes it a very sensitive site.
- Water tanks – Suraj Kund, Lakshmi Kund and Ram Kund: Three inland water tanks (or, kund) were also a part of the transect. These tanks were connected to each other and to river Ganga through drains, and were considered sacred as they had the water of Ganga.

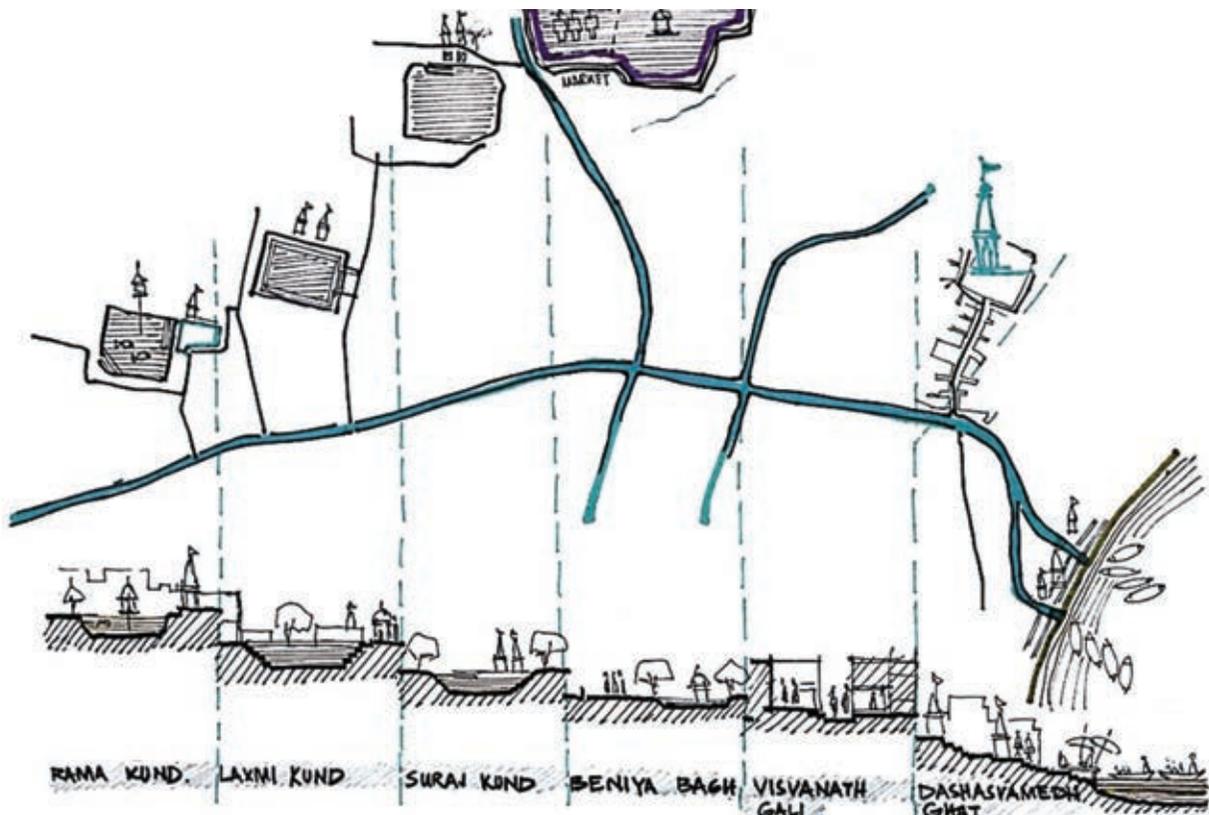


Figure 4.1 The points of interest in the transect

4.2 Objective

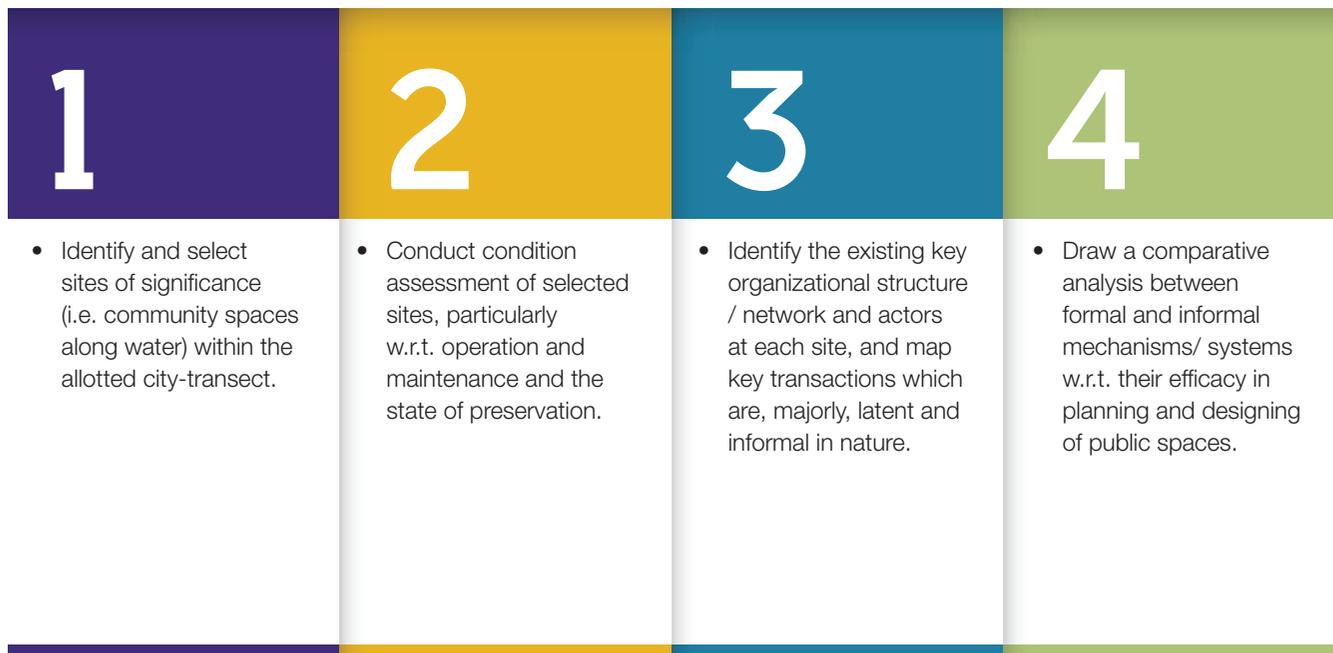
The overarching objective of this part of the study is to explore the role of local informal social systems in planning and designing of community-spaces along water. This is being achieved by undertaking following tasks.

- Identify and select sites of significance (i.e. community spaces along water) within the allotted city-transect.
- Conduct condition assessment of selected sites, particularly w.r.t. operation and maintenance and the state of preservation.
- Identify the existing key organizational structure / network and actors at each site, and map key transactions which are, majorly, latent and informal in nature.
- Draw a comparative analysis between formal and informal mechanisms/ systems w.r.t. their efficacy in planning and designing of public spaces.

These are being discussed considering the empirical case of Dashashwamedh Ghat transect in Varanasi.

4.3 Methodology

The transect contained many points of interest having very contrasting nature in terms of size, religious value, people's connection to water, organizational structure etc. Different actors, performing various tasks and providing seemingly unconnected services, were interviewed to narrow down the research area. The exploration of the transect and the actors led the team to explore the inherent but invisible organizational logic which run the whole "show". The methodology followed is given below.



4.4 Timeline of the field studio

The exploration of the transect started on 7th of January 2017. The team walked along the street starting from Godoulia road-intersection towards Dashashwamedh Ghat. It was highly apparent from the surrounding character that the entire economy of the street is heavily dependent on tourists and pilgrims. All the shops were selling either the things needed for worshipping rituals, or souvenirs for tourists. The stretch ended at the ghat – a plaza bustling with varied activities.



Figure 4.2 View of Dashashwamedh Ghat – bustling with activities even at night time

The team conducted a quick reconnaissance survey on Day-1, and finalized important locations for further exploration in terms of interviews and other details.

On successive days (8th, 9th and 10th of January), detailed site-visits were followed by lectures from few local experts. These detailed studies included photo and video documentations, observations of people's activities including unstructured interviews with local residents, businessmen, tourists, pilgrims etc.



Figure 4.3 Dashashwamedh Ghat during the day

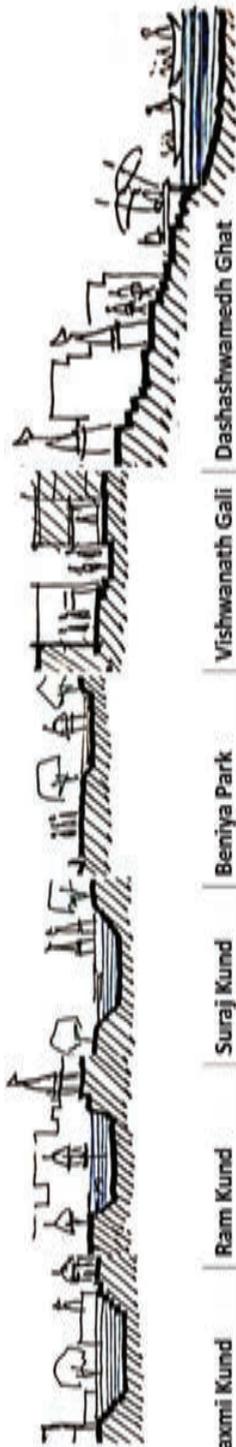


Figure 4.4 Laxmi Kund

The interviews were conducted to understand the latent and informal hierarchy and role of different players at these places. These players were first identified and were asked questions about their day, their origin, their relationships with other actors, the duration of their operation etc.

4.5 Narrative of the evolving experience

Six locations (mentioned earlier) were chosen due to their religious and social significance. Water, whether present or absent played a very important role in deciding their significance for the current generation of care-takers. The Dashashwamedh Ghat, besides river Ganga, held utmost value for people; whereas Beniya Bagh- which currently had no water and was converted to a park - held the least value for citizens, visitors, as well as the government. It was also observed that each of these locations had different type of management systems in place which was evidently visible in the physical condition of each of these locations. Out of the six sites, three have been discussed in detail to highlight the effect of these inherent management systems on the chosen sites.

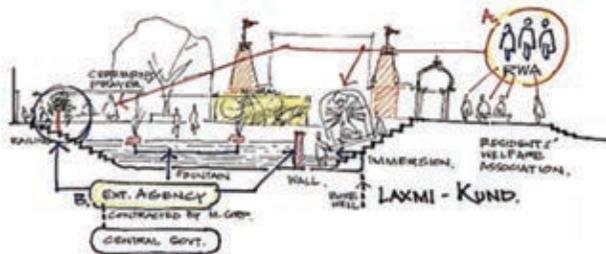


	Laxmi Kund	Ram Kund	Suraj Kund	Beniya Park	Vishwanath Gali	Dashashwamedh Ghat
Uses	Bathing Temple Ceremonies Recreational open space	Temple Ceremonies Recreational space No immersion of idols	Bathing Public Open Spaces No immersion	No water and Bathing Market Nomadic Community Park	Worship Residents Commerce	Bathing Worship/ Puja Ceremony Recreation Vending
Festivals	Durga Puja Dev Diwali Lakshmi Puja	Dev Diwali	Dev Diwali	-	Temple Ceremonies – Daily Mondays (specially crowded) Other Shiv festivals	Gana Gauri Ramanavmi Ganga Saptami Ganga Dushahara Nirajala Ekadashi Kajri of Kajliji Durga Puja Kartik Snan Nagnathaiya Budhwamangal
Actors/ People	Residents Pilgrims	Residents Pilgrims	Residents	Public Nomadic Community	Public Residents Visitors Workers Police	Locals Outstation visitors Pilgrims (locals/outstation) Researchers/scholars Boatmen Cameramen Priests Food stalls/vendors Beggars Sellers of ceremonial things Lamp sellers Barbers cleaning staff Boats facilitating "feeding the seagulls"
Controllers/ Agencies	Resident's Association Govt./ NBCC	Individual	Residents	Multiple Agencies	Traders Association Police	Individuals Gangotri Seva Samiti
Govt. Intervention (ongoing/ proposed)	Renovation ongoing	-	Renovation (Proposed)	Cancelled/ Withheld (contested Site)	Ongoing (Partially)	Ongoing (Partially)

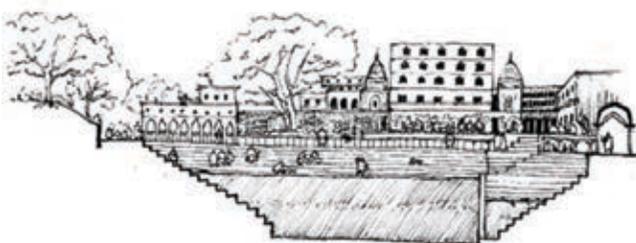
4.5.1 Laxmi Kund

Laxmi Kund has been taken over by the Government of India under its flagship scheme titled- HRIDAY – Heritage Rejuvenation and Integrated Augmentation ‘Yojana’. Operation and maintenance work has been given to a third party through tendering process. The external agency, though good in its intentions, has put up a wall cutting out a part of the pond for immersion of clay idols during Dura Puja – an annual religious festival. The agency cleans water in the tank as per the terms mentioned in the contract, and not according to the needs of the pond. Beautification-drive has led to building of a barrier between the water and the community, both literally and figuratively. Other works of beautification included adding layers of stones on already existing ones and covering them up, instead of conserving the previous layers. The community has a Residents’ Welfare Association (RWA) which used to manage the tank before the agency was being contracted the work of cleaning of the tank. Thus, despite of the fact that the residents’ body may not have been fully efficient in maintaining the water quality and do the upkeep, but it had lent them a sense of ownership of the place. The RWA is still functional, but at a very superficial level as they absolutely had no control in the decision making process.

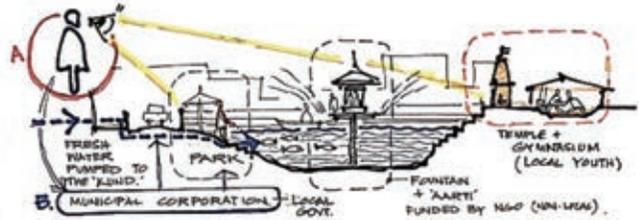
ORGANIZATIONAL STRUCTURE



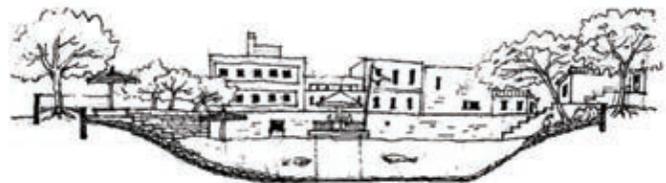
LAXMI KUND



ORGANIZATIONAL STRUCTURE



RAMA KUND



4.5.2 Ram Kund

Ram Kund was one of the cleanest and best managed tanks of the set studied. It had fishes, turtles and supported the local ecosystem in many ways. Immersion of idols was completely banned and even the connection to river Ganga was kept intact. Management of Ram Kund is being single-handedly led by an individual working with the press. He has been successful in managing the pond with the help of the Municipal Corporation. He also tries to inspire the community into participating in the maintenance work but hasn't been quite successful with it. He did this work as a part of his social duty but his failure to engage the community might be detrimental for the tank once he stops for any reason.

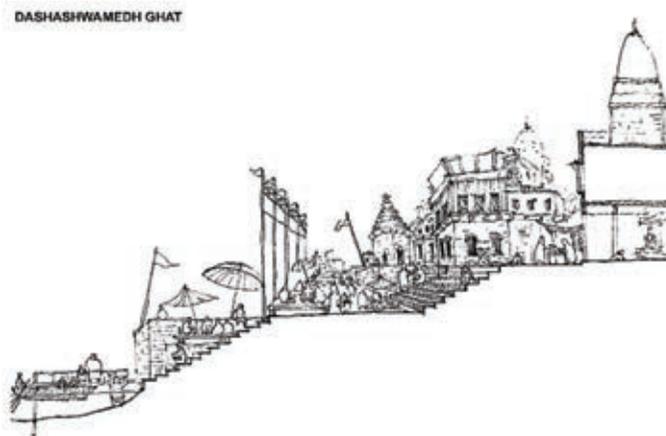


Figure 4.9 Section of Dashashwamedh Ghat

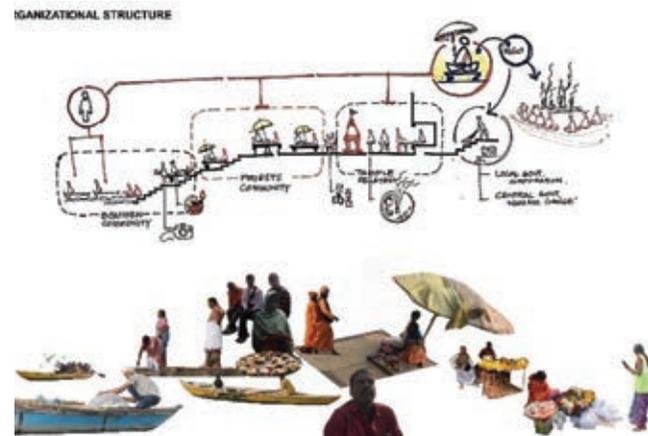


Figure 4.10 Organizational structure of Dashashwamedh Ghat

4.5.3 Dashashwamedh Ghat

Dashashwamedh Ghat being the most important site had a very complex distribution of public and private players and their interactions and transactions. Different government schemes were directed in maintaining the ghat, but it's the private players operating from the ghat who were mostly managing the complex web of activities. There was a generational ownership of different professions and activities on the ghat which has led to a hierarchical distribution of rights as well as duties. People felt a generational obligation towards the management of the ghat and ended up working selflessly for the betterment of it. Keeping their intrusion upto a physical level, different public agencies were helping the community in functioning as a whole. This level of community participation was clearly visible on the ghat which was clean even after being the most crowded one for the entire year.

4.6 Conclusion

The study observed that instead of formal governance system and government-led planning mechanism, locally evolved informal networks of residents are more effective in guiding development and management of community spaces. The study focused on exploring public spaces along water, particularly along river bank and water tanks. A busy ghat on Ganga river front and three inland tanks were selected as test-beds. Degree of government's intervention in each of these sites varied.

If formal planning mechanism led by governments at different levels (local, state, and centre) fails to recognize the initiatives taken by grass-root level local organizations, it robs off the local community of its sense of ownership which it used to enjoy when government machinery was not a party in the development and preservation process. Thus, it is desirable that government-led planning interventions identifies such informal social networks in place, and make them a party in the development process, instead of disempowering the latter.

The role of the government should be of an enabler (as in the case of the ghat) rather than of a provider (as in the case of Laxmi Kund). It should also be noted that the typical mind-set of government-led planning and design mechanism of "one design fits all" needs to change and every case needs to be studied separately and the proposals should respect the local sensibilities.

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*“Here religious feeling reigns supreme,
and no sensual thought ever seems to
assail these beauteous mingled forms.
They come into unconscious contact with
each other, but only heed the river, the
sun, and the splendour of the morning
in a dream of ecstasy.”*



Pierre Loti

Chapter 5

Social Scale of Water: Kedar Transect

Akshit Shah, Arpan Paul, Shrivan Wattamwar

5.1 Introduction

Being one of the important substance, water always play an important role in community wellbeing and social boost ups. Water is always in motion, varying conditions, crossing borders, and beneficial for livelihood. Water Urbanism is an advanced approach to strategy development and aspects that holistically associated with social and physical infrastructures, public health, and community wellbeing.

Varanasi is one of the oldest and continuously inhabited cities in the world along the bank of the river Ganga. The rituals and beliefs associated with the water in Varanasi have changed due to the drifting trends of community inception. The trend has been started in 1892 when water-works has built the capacity of 33MLD to cater 200,000 citizens within the Varanasi Nagar Nigam boundary.

From that time the water management approach by the water-works have been raised with the population. Water penetration morphs the social interaction at every level, starting from the ancient narrow lanes, busy crowded markets to newly developed areas. Even with the human intervention on water management system water finds its own way of communication with the community by helping potters, providing with clay from siltation process to keep up their livelihood and by providing water to washer men ('dhobi') etc. These water-based communities are on the verge of termination due to the unbalanced growth of the city. The ancient water management systems of kunds and ponds are also faded away with improper management.

It is evident from the recent studies, that the Varanasi has a decreasing trend ground water table and its degrading quality. Old ponds of the cities are slowly getting converted into garbage yards which eventually polluting groundwater. The present study has focused on the level of services of existing water supply system and its potential for rejuvenating the water management systems for community sustainability. Figure 5-1 shows our study area which comprises of a trail from the Kedar Ghat - water-works station at Bhelupur and a Kammacha.

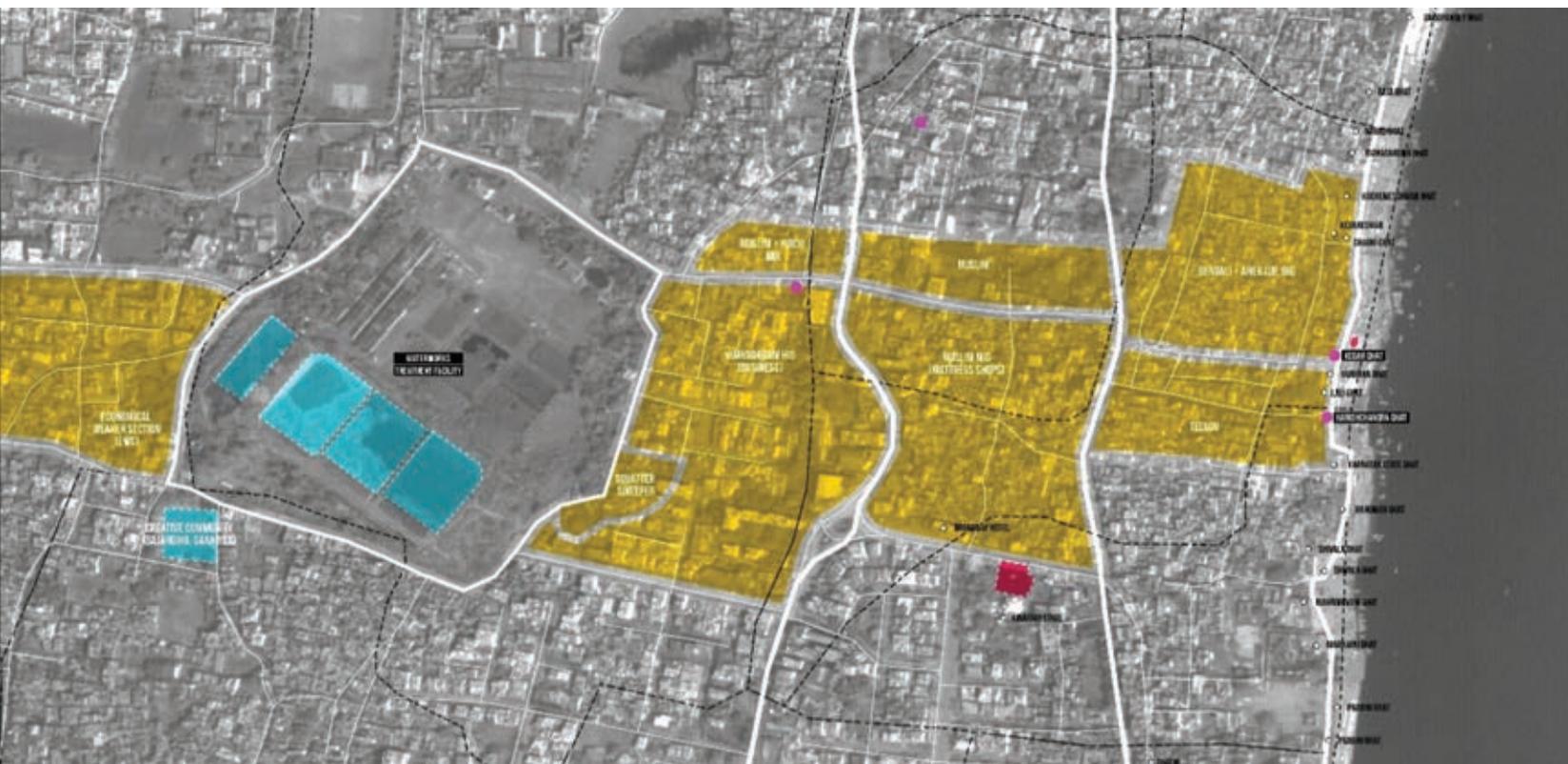


Figure 5.1 Kedar Ghat to Bhelupur water-work station

5.2 Objective

The overarching objective of this part of the study is to explore the potential of ancient water management system to rejuvenate as a framework for future water-based communities. This is being achieved by undertaking following tasks.

- Find the growth of the city and present status of water supply
- Uncover the penetration of water through the urban area
- Validate the present water supply status
- Find the water-based communities which are directly or indirectly depends on water.

5.3 Methodology

This study demands qualitative as well quantitative research approaches to attain the goal. Secondary data has been collected from City Development Plan (CDP), Varanasi to understand the present status of water supply and its distribution patterns. Additional literature studies have supported by validating the reality of water quality and its availability. Study trail started at Kedar Ghat with small lanes and passed through the market areas, Sonarpura, Vijaynagaram Colony, Water-works station, Sankuldhara Kund and finally reached to Kamaccha. The trail helped in targeting the selective consumers for interviews such as residents, small-scale businessmen, ancestral businessmen (such as, washer men or 'dhobi') and families involved in a creative economy like pottery and toy making. Along with this, on site observations and camera journaling capture the quantitative and qualitative information by putting us on the consumer side.



Figure 5.2 Methodology flowchart

This data has been utilized to identify the parameters to evaluate the different zones in the study area. This study has been synthesized by converting the research information into key insights which contribute to the conclusion to find the level of service of water supply and necessity to build the synergy between water-based community and the water management system.

5.4 Timeline of the Studio

5.4.1 The trail from Kedar Ghat to Water-works

The survey has been started from Kedar Ghat, moving from the dense settlement of Bengali Tola towards less dense and organized development of Vijaynagar and water works department. Throughout this trail, various scales of water infrastructures have been observed. Starting from River Ganga to Kund to dhobi ghat, to public bore well and stand points and the massive one as water treatment plant. Within this stretch, one finds the hierarchy of street wideness and density of settlement, denser to rarer, narrower to wider, organic as planned and so forth as we move inwards from River to the city. And the same is affecting the infrastructure delivery system and level of service. Ultimately this has been made an impact on community participation and decision making approach. This we shall see in the detailed interaction with each locality as follows.

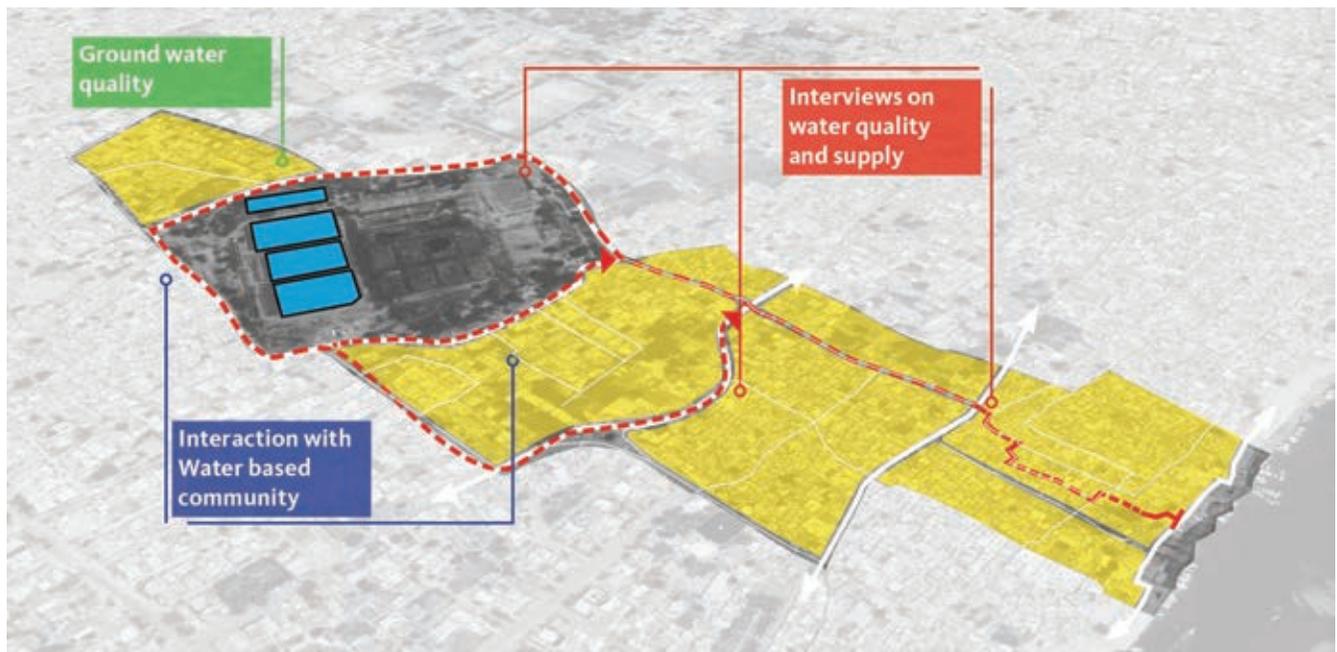


Figure 5.3 Trail from KedarGhat to Water-works and locations of interviews conducted

5.4.2 Bengali Tola : Kedar Ghat to Sonarpura Road

Kedar Ghat is very well known for the Kedareshwar Temple and Gouri Kund which believed to have healing properties. Surrounding area of Kedar Ghat is greatly resorted by Andhra, Aher and Bengali communities. South of the Kedar Ghat has Chetsingh Ghat, Badhaini Ghat and Tulsi Ghat. Badhaini has the water pumping station of the water-works. Large pipes are laid out into the river at various level to draw out the water and pumped up to Bhelapur Water-Works.

Main access to the street from the ghat is a small stairway and tunnel which leads to ancient narrow lanes which are 2-3 meters wide. This trail starts from behind the Kedar Ghat through dense built-up area, thus leaving narrow room for access lanes and utility lines. These lanes are organic in nature and they keep building the sense of curiosity at every point in time while walking.

Treated water is supplied in this area with individual non-metered connection and with community water-points for four hours a day: two hours in the morning and two in the evening. Water quality is sometimes not good and it is muddy with a foul smell. Slowly people are moving towards personal bore well, which is leading to groundwater depletion and degradation. Communities in this zones associate themselves with activities in and around Ganga River.



Figure 5.4 Water supply system pipes running on the surface through the Kedar Ghat lanes

5.4.3 Gauriganj: Sonapura Road to Durga Kund Road

Settlements get slightly less dense than the ones along the ghats as we move away from the river. Gauriganj is a mixed-use settlement area where small buildings accommodate the businesses on the ground floors and residences on upper floors. The area is dominated by middle and lower-middle-class Muslim families. They are engaged in home-based manufacturing of mattresses and sarees.

Gauriganj is supplied with treated water from water-works but only for two hours in the mornings and three in the evenings. Quality of water is below grade, and people often complain that it is muddy with a foul smell. People also depend on public tubewells as private bore-wells are very less in this zone.



Figure 5.5 Different types of water standpoints in Gauriganj area

5.4.4 Vijaynagar: Durga Kund Road to Kamchchha Road

This is a well-planned residential area of high-income group. Most of the families are from the south of India but are settled here from the past 5-6 generations. This area has gated communities and housing societies. Residents are majorly engaged in retail business and service sector.

The water supply system is relatively newer and pressure is also maintained as this locality is near to water works. Water is supplied for five hours a day. Communities don't depend on municipal water supply as they own privately owned bore-wells.



Figure 5.6 Vijaynagaram HIG society followed by Dhobi Ghat and Squatter settlement

5.4.5 “Vijaynagaram Squatter Settlement between Sonarpura Road to Durga Kund Road”

There is a squatter settlement near Vijaynagaram Colony. The site is situated between areas lived by medium to high-income group societies. This area comprises of a ‘Dhobi Ghat’ (washer-men’s area), which is functioning for last 60 years. Earlier this water-based community was settled here; but later due to urbanization, price of the land got substantially raised and people sold their lands to real estate developers. But the ‘Dhobi Ghat’ is still operational, and washer-men from other parts of the city commute every day to this place. Moreover, residents of surrounding are as employ these people by providing them with unskilled jobs, such as sweeping, cleaning, and security. Most of the female members of their families work as domestic help in the surrounding gated communities.

The ‘Dhobi Ghat’ is a prominent example of water utilization with the changing pace of urbanism. There are many other dhobi ghats in Varanasi, like Nandeswar, Khajaopura, and Koniya. Washer men from Bhelupur, Durga Kund, Vinayaka, Kamchchha, and Sonarpura mainly depend on this site. Though the major water source of this site is the water supply dept. (Jal Nigam), bore wells are majorly used these days due to inadequate water supply.

5.4.6 Water Works Department

This is central water treatment facility for Varanasi city which was established in 1892, right now serving the citizens with 125 MLD of treated water which is just 45% of the total requirement. The massive block has one water intake tank, four sedimentation tanks and three rapid gravity filters. The optimum potential of the whole setup is about 250 MLD but the operation is constrained by the intake capacity of water intake towers at Tulsi Ghat. The department is also engaged in developing and maintaining new and existing water supply network. Due to the recent push for utility upgradation and installing them underground, there are frequent incidents of pipe burst due to drilling where prior awareness of water supply pipe line was not obtained. The department does have capacity expansion plan over next five years to cover the 100% water demand as well as installing a water meter to each connection for the better financial position. As the department is under fund crunch and not able to 100% monetize on the service it provides, due to 0% metering.



Figure 5.7 Water intake pipe from Ghat, sedimentation tank and gravity filtration system

5.4.7 Sankuldhara Kund and beyond

Sankuldhara Phokra, or Kund, is one of the oldest ponds in Varanasi located near the southern part of the Water Works. It is very famous for a fair/festival - Katakariya Mela. An indigenous creative community skilled in pottery lives by the pond. They produce clay-based pottery, such as pots, cups, lamps (‘diya’). Basic raw materials, i.e. clay, is collected from nearby water-works.



Figure 5.8 Creative community settlement involved in pottery besides the Sankuldhara Kund

Table 5.1 Comparison of different zones based on identified parameters from a field visit

Parameters	Kedar Ghat to Sonarpura Road	Sonarpura Road to Durga Kund Road	Durga Kund Road to Kamachha and beyond
Land-use pattern	Residential and Commercial	Residential	Residential
Predominant community	Telugu (behind Harish Chandra Ghat); Bengali and Aher (Sonarpura)	Muslim (Gauriganj)	Hindu and Muslim (Bhelupur, Jawarhar Nagar and Kamachha road)
Predominan occupation	Self-employed (mainly sweet makers, utensils makers and equipment sellers for religious purposes)	Self-employed (embroidery and saree industry, mattress making etc.); Services(various government and private sector)	Self-employed (business, shop-owners); Services (various government and private sector)
Income Pattern	Lower-middle to upper-middle class	Lower-middle to upper-middle class	Upper-middle to high-income group
Street patterns	Narrow alleys (1.5 to 2 m)	Arterial roads (3 to 5m)	Arterial roads (4.5 to 6 m)
Utilization of water			
Source of water	Water Works	Water Works	Water Works
Time of water supply (Daily)	5 hours (2 hours in morning, 3 hours in evening)	5 hours (2 hours in morning, 3 hours in evening)	5 hours (2 hours in morning, 3 hours in evening)
Quality of water	Bad (contains iron)	Moderate	Moderate
Tube wells	Present	Present	Present
Bore wells	Present	Present	Present
Ground water availability	Moderate	Low	Low
Ground water quality	Moderate	Moderate	Moderate
Open drains	No	Yes	Yes
Basis of water tax	(Based on plot-size and the count of households staying within the plot.)		
Billing for water tax	Annual billing system	Billing twice in a year	Billing twice in a year

5.5 Research Synthesis

The existing condition of water supply and the quality is sub-standard. Further investigation to the root level, we found that it is found that total water required is 330MLD out of which the only 125MLD is treated at Bhelupur Water Works station and rest of the demand is fulfilled with ground water. Storage capacity including elevated storage reservoir (ESR) and Ground storage reservoir (GSR) is 80MLD which is only 24.25% of total demand in the single filling and 48.5% in the double filling. This is the reason behind the interrupted water supply.

Additionally, many consumers claimed that they get polluted and muddy water from water-works. Interviews with the locals we found two unfortunate reasons associated with it. First is the ongoing construction due to which excavations for construction and services leads to damage to water supply and the same water is supplied to households. Second, the proximity of sewer line and water supply line due to which sanitary water enters into the water supply pipes at night time and the same is supplied throughout the city.

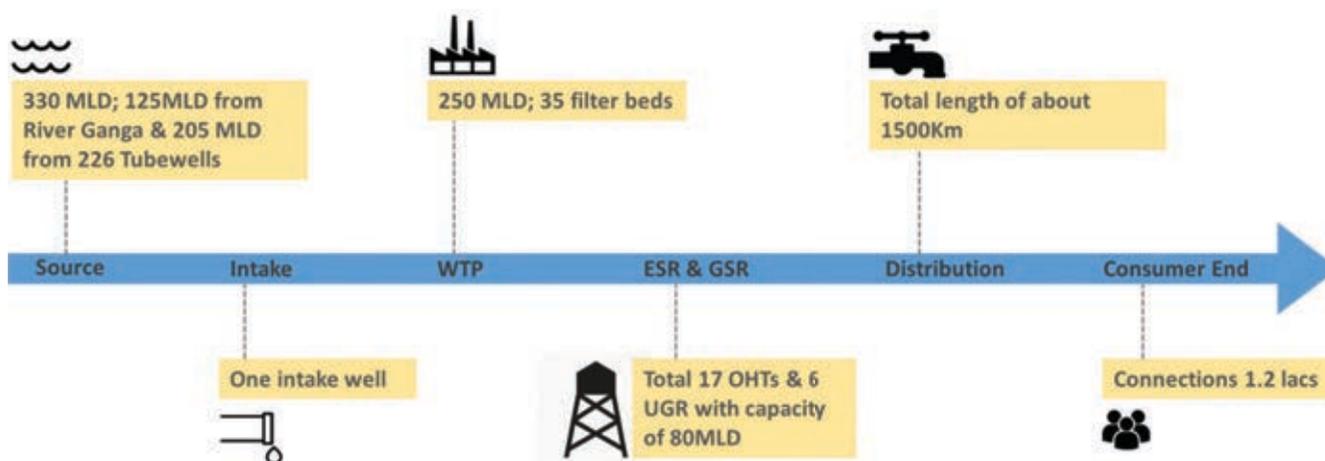


Figure 5.9 Water supply - existing distribution system

5.5.1 Service level

Recent studies found that the quality of ground water, as well as the water table, doesn't stand in favour of the city. Rapid urban growth and diminishing recharge points had degraded the water table and pushing the limits of the city to rethink the solutions. Furthermore, the ancient recharge points have been transformed into garbage yard, resulting in ground water contamination. Six sites were studied by researchers and numbers did not comply standards. Water supply is not continuous and it was falsely claimed to be 10 hours according to CDP 2041, but in reality, it is just 4-5 hours a day.

Table 5.2 Existing service level of water supply system

Sr. No.	Indicators	Outcome	MOUD Benchmark
1	Coverage of water supply connections	69%	100%
2	Per capita supply of water	186 LPCD	135 LPCD
3	Extent of metering of water connections	0%	100%
4	Extent of non-revenue water	58%	20%
5	Continuity of water supply	10 hours	24 hours
6	Efficiency in redressal of customer complaints	96%	80%
7	Quality of water supplied	96%	100%
8	Cost recovery in water supply services	61%	100%
9	Efficiency in collection of water supply related charges	92%	90%

5.5.2 SWOT Analysis

Based on the physical infrastructure solutions and rejuvenating ancient water management system, we narrowed down the strategic locations and reached out engineers from water-works station, residents and water-based communities to assess the proposal. Everyone was concerned about the quality of water and interrupted water supply.



Figure 5.10 SWOT analysis

5.6 Conclusion

It is undesirable to go for groundwater to fulfil the present demand as the groundwater quality is poor and groundwater table is also decreasing. Rather, the water-based communities can be effectively engaged with ancient water management system to improve the creative economy and recharge the groundwater. Present water treatment plant (WTP) at Bhelupur has a capacity to supply 250MLD but it has an intake of just half the capacity.

- To provide treated water to 100% population we need infrastructure upgradation and development
- Based on population distribution one more Intake point of 125MLD for Cis-Varuna region is enough for next 15years. New WTP with separate intake point of 150MLD in Trans-Varuna region would cater the population up to 2040.
- Water-based communities have huge potential in improving the economy as well recharging ground water.

Further detailed study of potential locations of water-based community would be required to take this exploration to next level. The potential locations and the socioeconomic and cultural backdrop is essential to arrive at a synergetic solution

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*“I found Varanasi absolutely staggering.
I have never seen anything like it
before. The city just spills into the
river Ganges... It’s really, really
extraordinary!”*



Brad Pitt

Chapter 6

**Social and physical
transformations of urban
landscape around water use
and challenges ahead: Assi
Transect**

Sristhi Shubh, Rana Pratap Singh, Dipanjan Nag

6.1 Introduction

The ancient city of Varanasi on the banks of Ganga is a manifestation of gradual and seamless formations and transformations of human settlements, across centuries with the water channels of Varuna, Assi, and Ganga as witnesses encircling the sacred crescent land, infusing it with holy waters. The city is a superlative instance of a timeless city with a will of its own, which bursts forth in the form of rituals, traditions, art, and culture of the people. Water can be seen as an omnipresent agent within these forms. Tourist interest centres on the city's reputation as a place of spirituality and traditional knowledge, and that is spatialized in some distinct areas through some specific practices: the ghats, boated and celebrated in the 'Ganga aarti', and the Buddhist centre of Sarnath, about 10 km north-west of Varanasi. However, the introduction of western infrastructure and its unsuccessful assimilation into the water systems has brought a fracture in the proper functioning of the natural hydrological processes. With the continued exploitation of the urban hydrological landscape, the situation has been worsening, leading to unfavourable events like unpredictable floods, severe pollution, diseases and groundwater depletion.

The disruption of the natural flows and catchment has started showing its effects on the surrounding settlements. The burgeoning needs of an expanding urban territory are further enhanced by a need-based approach to the provision of services. Since provision of infrastructure has started driving the development, it has pushed the water channels and kunds into the backdrop. In order to bring the water bodies to the foreground of current urban discussion, we undertook the city as a case study on Water Urbanism. The following report is a summary of the surveys undertaken and the observations made so far.

6.1.1 Objective

- To document the inter-relationship of the water channels, reservoirs, and their stakeholders from Assi Ghat to urban hinterlands along the Assi 'Nala'(i.e. drain)
- To understand the transitions of water use, land use and socio-physical factors along the Assi Nala and the nearby kunds
- To address infrastructural encumbrances observed in the water systems, through innovative and site-specific solutions

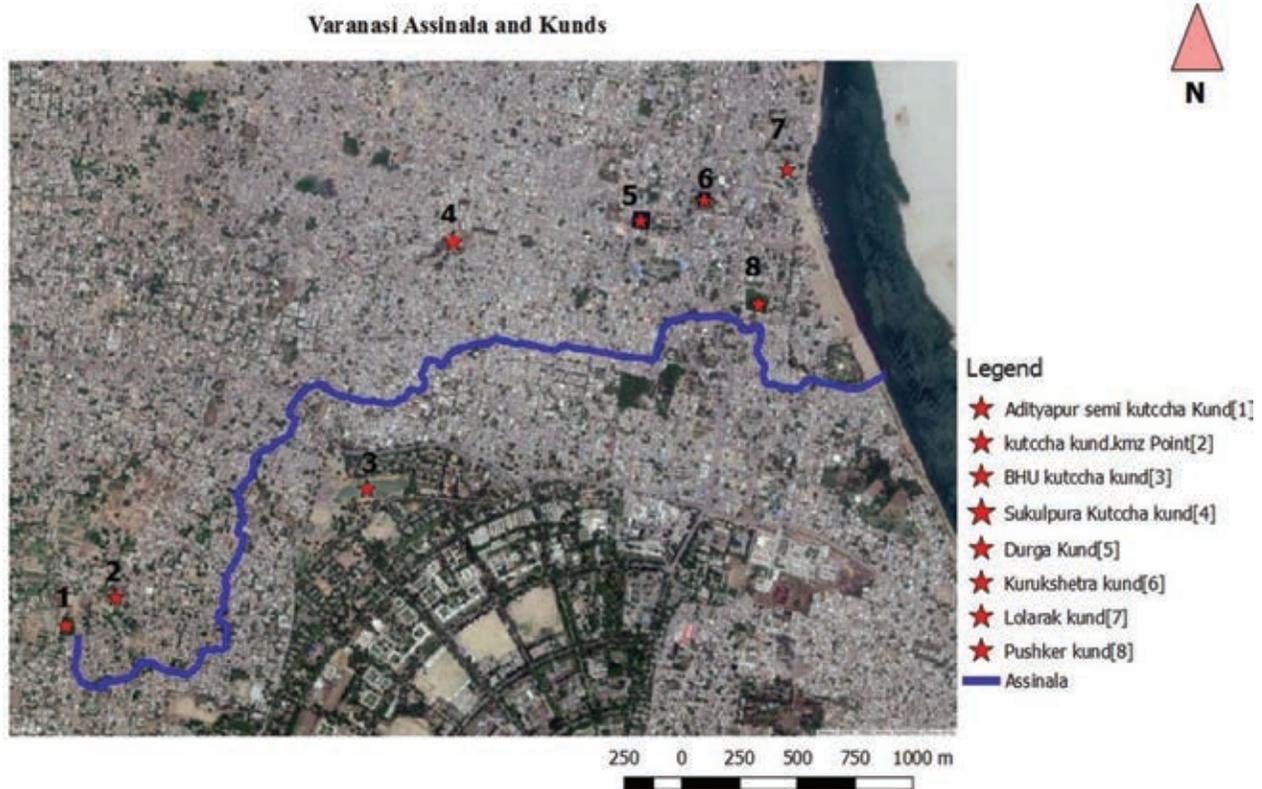


Figure 6.1 Map showing the study area along the Assi Nala

6.2 Methodology

The survey constituted a week-long period of surveys and documentation of existing conditions and unique scenarios associated with each transect of study. Our study was located along the stretch of Assi Nala and the associated kunds situated in the vicinity. The initial study area was not rigidly defined hence we had the liberty to expand our study area to extents which could give us a holistic picture of the existing scenarios. With Assi Ghat as the origin, we conducted an interactive survey of the localities as we moved along the Assi Nala into the transition zones from urban to semi-urban and rural.



Figure 6.2 Outline of the study methodology

6.3 Timeline of the field studio

Ghats, Sarnath, spirituality, centre of learning: these are the things on the basis of which Varanasi is marketed around the world. Everything is resolved around these things: morning boat ride, more recently Ganga Aarti, and Sarnath: this is what tour operators provide. Our typical survey days initially began with just few reconnaissance surveys of the area, subsequently followed by few tiresome days of finding the Assi Nala source.

Day 1

The first day constituted of surveys along the Assi Ghat, later branching towards the Lolark Kund, Kurukshetra Kund and Pushkar Kund. We then doubled back across Assi Nala following it along its sections through the city. The latter half of the day was spent on interviews along the Assi Ghat with Boatmen and surrounding formal/ informal businesses about their perception about the Ghats and the kunds.

Day 2

On this day we travelled deeper into the urban areas following the Assi Nala and two other kunds. We noted people's perception and activities along the Nala as well as the kunds. We reviewed our work in the evening to help us chart out the trajectory for next day.

Day 3

On the third day we travelled close to the BHU campus and came across other kunds in transition. This brought out situations with contested ownership and management of the water bodies. Interviews with people involved in several activities around the kunds and Nala paved the way for further investigation.

Day 4

On this day we travelled close to the urban fringe, which consisted of zones in transition from urban to rural. The dynamics of water use here were documented and perception about increasing encroachment on the Nala and kunds due to various reasons were discussed at length.



Figure 6.3 Snapshots from the field visits

Day 5

Discussions with teammates and the findings were documented for presentation to a panel of experts.

Day 6

A presentation to a panel of experts from a wide range of specialization was conducted. It was followed by discussions on the smaller nuances of the research questions brought out from the week long survey. Possible directions for future approach were brought out.

6.3.1 Analysis

Type of Water Source	Name/ Section	Observations
Assi Nala	Origin Stream (Adityapur to BHU Road)	<ul style="list-style-type: none"> Stream width ranges between 0.3m to 3.5m At several points water stagnates due to blockage by land filling or solid waste accumulation Swstarts near a rural area with less dense residential population and flows into well-developed residential areas Less rigid boundaries Sewage disposal into the stream is common Encroachment forcing relocation of stream
	Mid-Stream (BHU Road to Sankat Mochan)	<ul style="list-style-type: none"> Wider flow width from 1m to 25m and 64m at some points Falls in densely populated area with rigid boundaries Overflow due to rainfall can cause disruption of road networks and general livelihood near commercial areas of Sankat Mochan
	End Stream (Sankat Mochan to Assi Ghat)	<ul style="list-style-type: none"> Previous confluence with ganga shifted downstream to south of Assi Ghat to improve environmental quality of Assi Ghat Stream branches near the outflow Several informal settlements in the pockets near confluence with ganga Stark difference in environment at Assi Ghat and the confluence of the Assi Nala and Ganga
Kunds	Lolark Kund	<ul style="list-style-type: none"> Comparatively clean water o Cordoned Entry o Ritualistic usage Caters to Economic and Spiritual needs Managed by priests
	Kuru kshetra Kund	<ul style="list-style-type: none"> Free from Debris Soluble waste present, i.e.: detergents, oils, perishable materials Domestic and Social usage Locally managed
	Sukulpura Pond	<ul style="list-style-type: none"> Partially filled over Used as playground Holds Social value, currently contested ownership
	Durga Kund	<ul style="list-style-type: none"> Clean water Spiritual, Visual and Social value Low Accessibility Publicly managed
	BHU Pond	<ul style="list-style-type: none"> Depression on private land Acts as catchment for surrounding overflow Soon to be filled over for Construction
	Adityapur Pokhra	<ul style="list-style-type: none"> Semi Kutcha kund Domestic usage, with clean water filled from groundwater supply line Locally managed and cleaned
	Adityanagar Pond	<ul style="list-style-type: none"> Non-perennial pond Used for agriculture Contested territory, semi filled up

The spiritual, social, physical and economic uses of water show many variations as we moved along the Assi River through the densely populated city to the spread out suburban area. The local connections to water were expressed through the activities and initiatives for management of the water body. Two parallel approaches were observed for the Assi Nala and the Kunds.

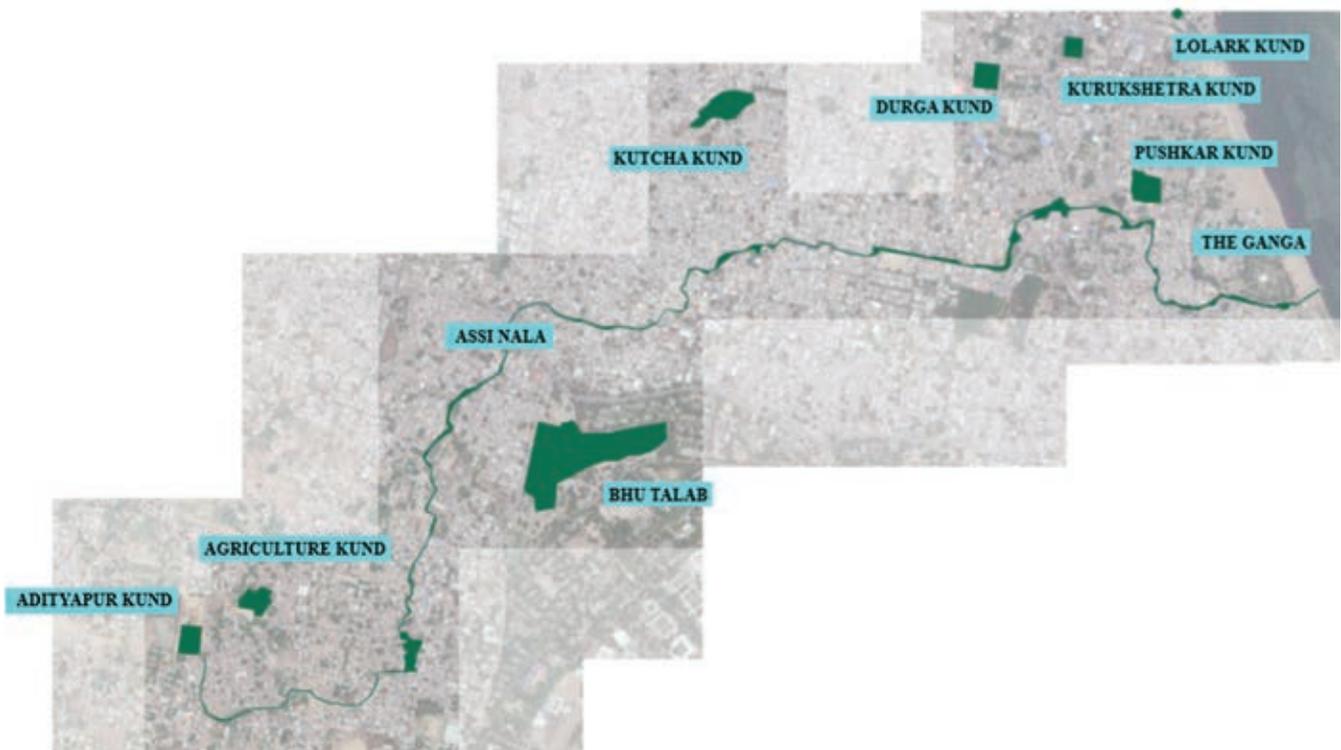


Figure 6.4 The Assi Nala and the Kunds in the surrounding

6.3.2 Continuous Source: Assi Nala

The Assi Nalais some 3.5 km long and meanders through densely populated built-up areas directly discharging wastewater into the Nala. All along there has been a severe encroachment of the Nala bed and channel and in the absence of adequate solid waste collection much garbage (including carcasses find their way into the Nala). It is a narrow stream which starts near Adityapur Pokhra and ends into the Ganga near Assi Ghat and is a continuous source since it flows. Since at the origin itself it begins as a Nala (hindi for a sewer/drain), serving the purpose of wastewater and sewage disposal, this characteristic continues throughout its course. The continuity of the channel through various localities makes it open and vulnerable to solid waste dumping, encroachment, and hence is challenging to be locally managed. It also serves as a catchment for displaced and distraught people of several areas, who find refuge and run their livelihoods from the small pockets formed around the Assi Nala. The importance of the water channel and its misuse is a dichotomous situation which can be improved.

6.3.3 Discontinuous Source: Kunds

The Kunds form a discrete set of the water source which is used by a specific set of community. Since the number of users is limited, the management and protection of Kunds have been more successful in certain instances. However, if the water dries out and the source does not function as a water body throughout the year, it remains susceptible to encroachment or is acquired by force illegally.

6.4 Narrative of the evolving experience

The absence of proper planning and management by the government, users have almost no choice but to put their trash and sewage into the Nala. The Nala is the backyard; the city has turned its back to the Nala. The water flow system is essentially broken. The kund sare different kinds of holding systems that exist in the region—which are both man-made (pucca) and natural (kuccha). The closer the kund are to the Ganga, the more pucca they are. They are extremely valuable in the social-economic—spiritual context. For example, the Pushkar Kund is heavily used despite its issues—runoff from nearby residences cause the water body to undergo eutrophication (excessive algal and plant bloom). Runoffs mainly include animal sewage, waste water from kitchens, car wash wastes etc. Interviewing the locals revealed that the residents of the locality puts emphasis on the cleaning of this kund on an annual basis, further this kund is considered religious due to the presence of a Bramha (Hindu god of creation) temple nearby.

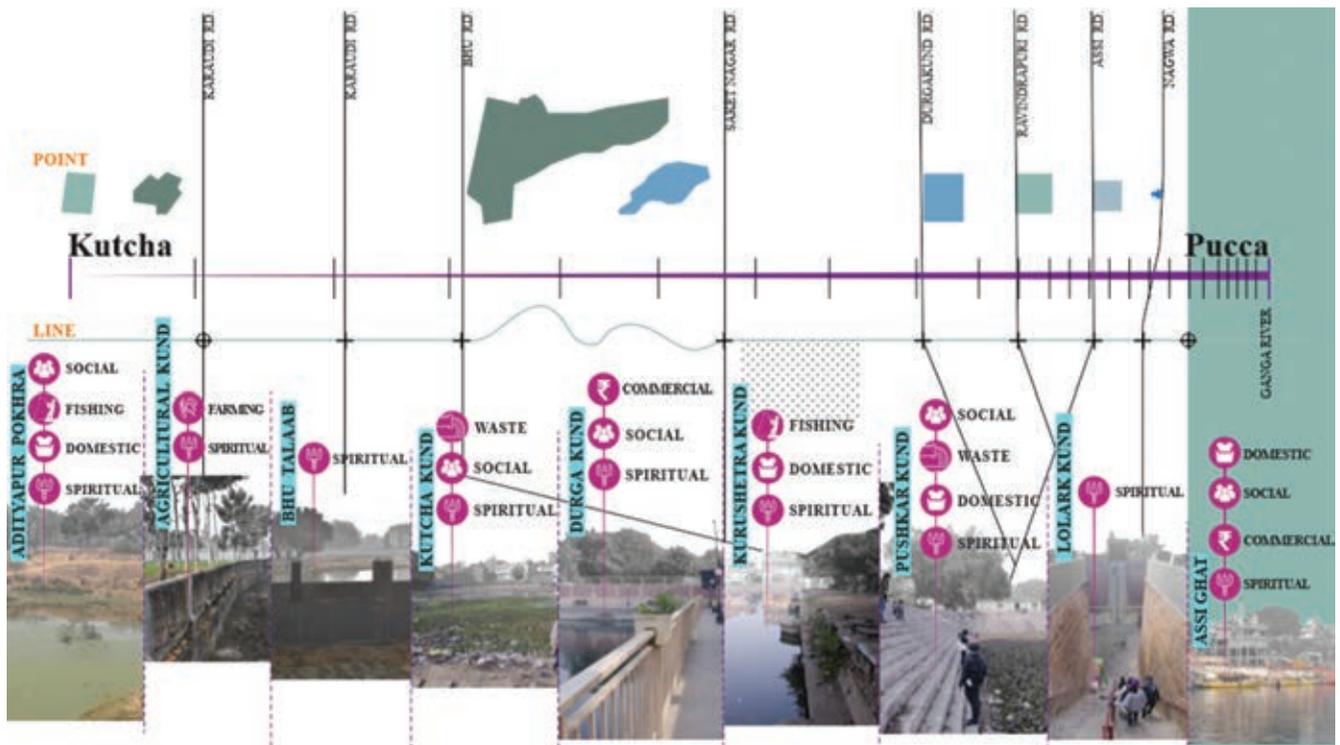


Figure 6.7 Various Kunds and their associated usage

A good example of locally managed Kunds which act as a safe source of water and as a place of gathering for the community is the Adityapur Kund located around the end of the Nala. The locals perceive the kund to be sacred and suggests this kund to be made pucca so that it is preserved and accessible from all sides and be used for domestic purposes. Sections of all the kunds change from kuccha to pucca, as the surrounding context changes from rural to urban. Further analysed each kund whether it was accessible by foot or hand, the spiritual connection of the people, as well as the prosperity of the surrounding people. People relate spirituality to the kunds that are closer to the river, however, as we move away we see the connection diminishing. The more prosperous settlements near the kunds also have low accessibility, as was seen with the Durga Kund as well as the 'talaab' (pond) on the BHU land.

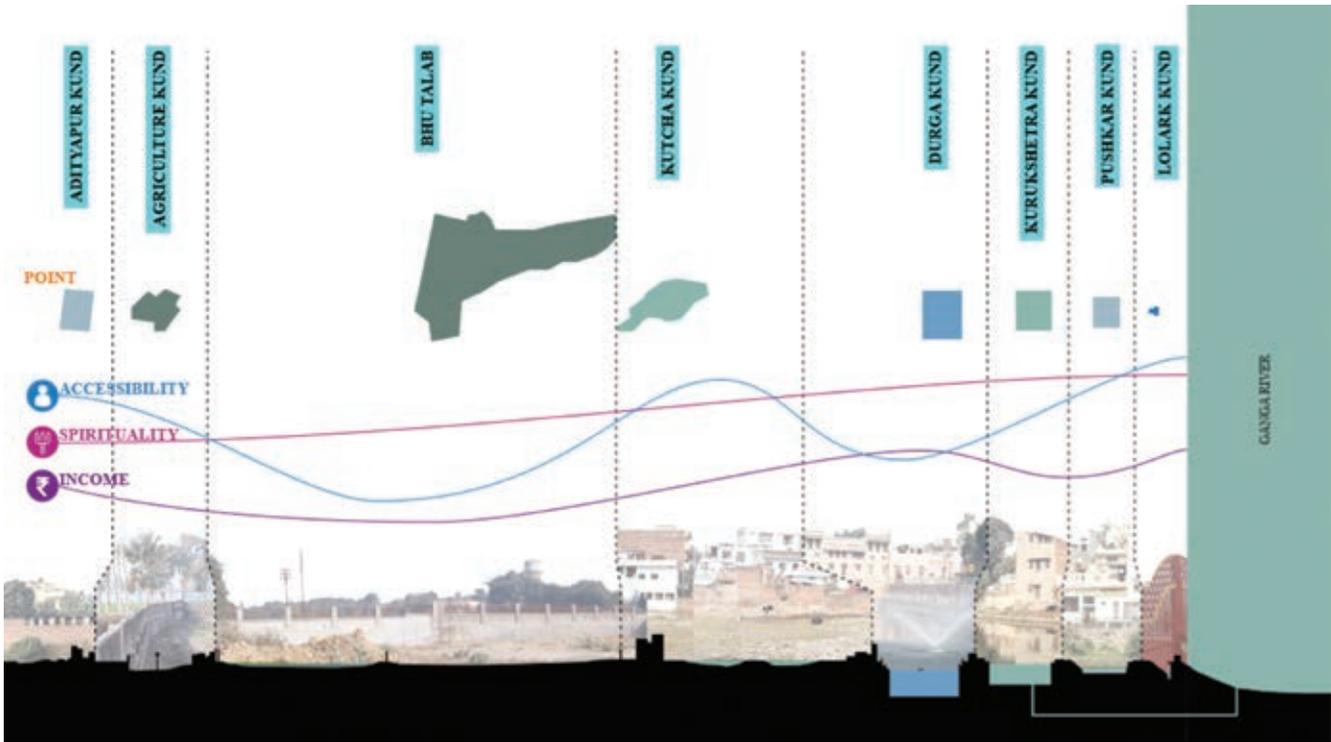


Figure 6.8 Accessibility, Spirituality & Income varies as the distance increases From River Ganga

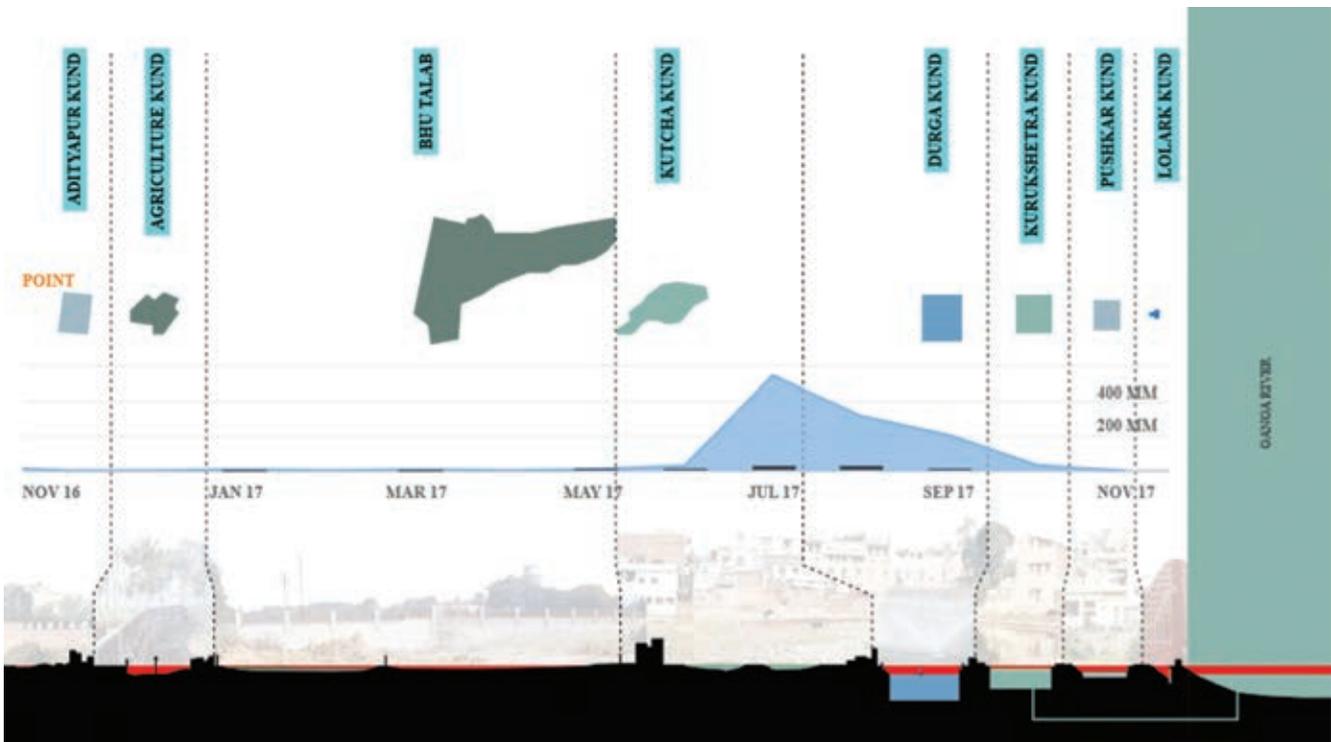


Figure 6.9 Water level variation in kundas throughout the year

6.5 Conclusion

The present water system of Varanasi has been functioning for more than 100 years. The public water supply system in Varanasi was introduced in the year 1892. In the beginning, it was designed for a population of 200,000 people, equipped with one water treatment plant in Bhelupur, the very central area of the city. (JNNURM, 2006)

The gap between supplier and the users has led to a fractured understanding of water among people, leading to a shift of attention towards Ganga, and complete disregard for the channels like Assi Nala and the weirs from kunds that flow into Ganga.

Encroachment of urban growth onto the banks of the Assi River has caused it to shrink in width, leading to solid waste dumping, complete encroachment and sewage flow into it.

However, with disappearing kunds, a common drive to protect some of the kunds was observed among the locals. Hence several 'kutchha' kunds that we came across were being cleaned and managed by the local stakeholders. Illegal claim on the pond land is a common practice. This kind of misappropriation of social assets was stopped through a common agenda by the local people in several instances.

This led us to believe that there is a strong public support and introducing policies which has a participatory approach will yield better result in moving the urban development pattern to be water centric rather than infrastructure centric.

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Chapter 7

The Nomadic Landscape: Sandbanks of Varanasi

Shadab Arif Ansari, Sunny Bansal, Thaju Zaman

7.1 Introduction

The sandbank area of Varanasi is a temporal landscape formed by the deposition of sand through the meandering of River Ganga. This is a nomadic and evolving landscape, which does not fall under any of the administrative boundaries (neither Varanasi Master Plan nor Ramnagar Master Plan). Few activities are found here, which are either commercial or agricultural based, but are scattered and unorganized. Considering the constant flow of tourists to this holy city, sandbank development could potentially lessen the crowding and congestion of the busy Ghats.



Figure 7.1 The Sandbanks

When we are proposing a better system, we are not only focusing at the physical space and specific facilities but at a cycle of activities originating at local level, including local activities, materials and human resources, preserving the cultural history and ecology of this landscape. The ecological aspect is of significant importance because of the temporality and dynamicity of the sandbar as shown in Figure 7.2.

The sandbanks get inundated during monsoons and are only available for 7 to 8 months in a year on an average. The erosion on the west bank along with silt deposits from upstream flow have gradually increased over time due to prohibition of sand mining and deforestation originating upriver respectively. As the expanse of the sandbar increases, width of the river reduces and risk of flooding increases. Hence there is a need to manage this dynamic sandbank with sustainable designs taking into account the flooding cycle as well as the process of erosion and deposition.

FEBRUARY



AUGUST

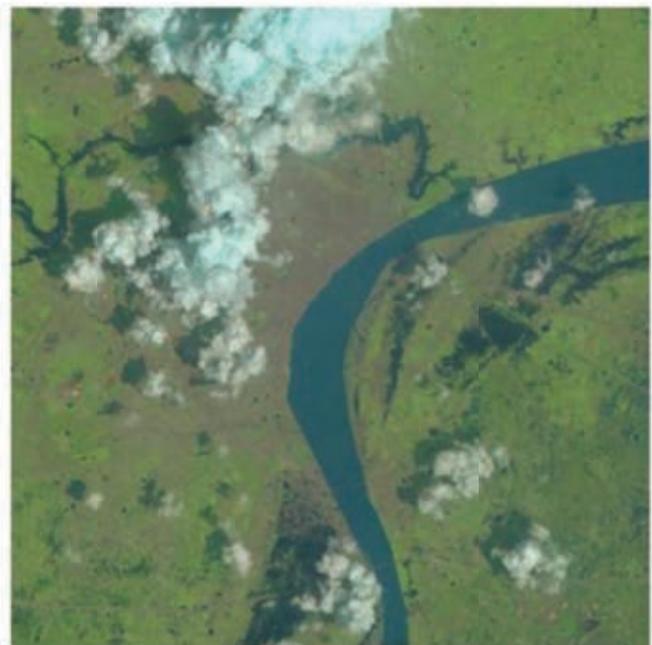


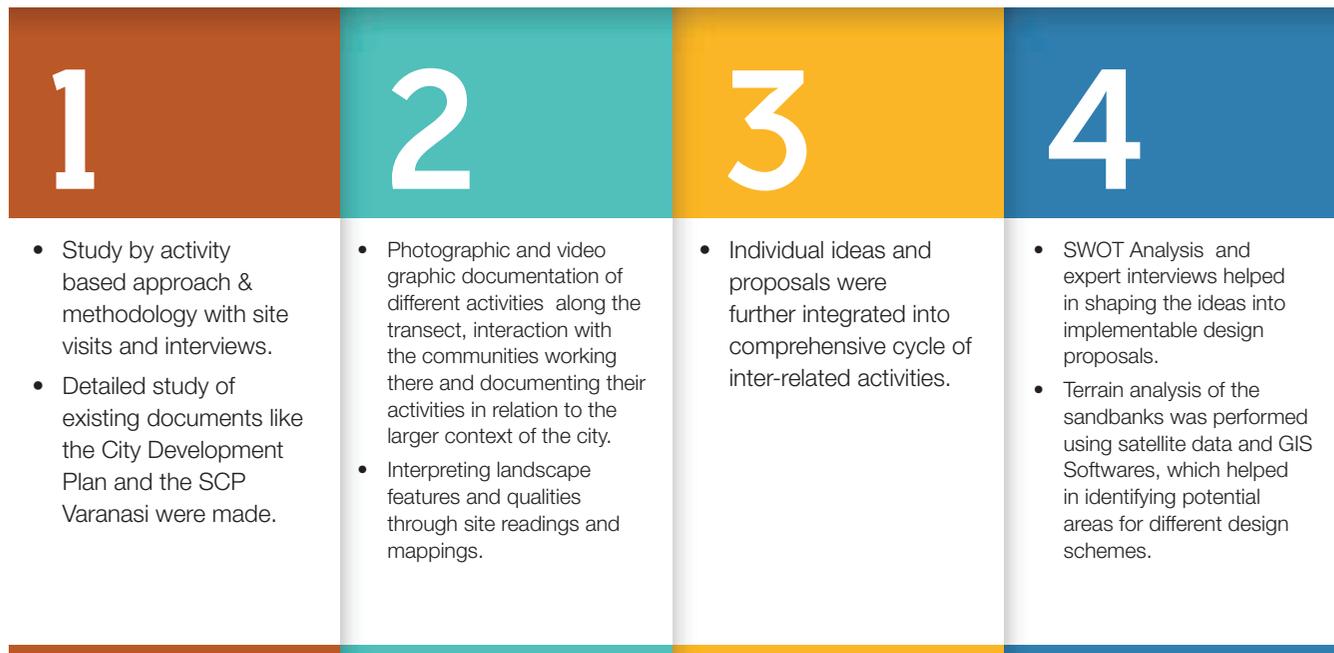
Figure 7.2 Sandbank Temporality (i) Dry (ii) Submerged

7.2 Objective

The objectives of the study are

- To understand if the sandbank can act as a model for socio-ecological urbanism grounded in change and time?
- To propose a physical space for commercial transactions and cultural exchange on the sandbanks opening up new possibilities, which is culturally relevant, socially and economically inclusive, and an implementable one.

7.3 Methodology



7.4 Timeline of the field studio

Day 1 – The Sand banks (opposite to the Munsii Ghat Area)

The movement from Ghats to the sandbanks entails the transition from feelings of congestion to openness as we cross the river. Upon reaching the other side, the sense of relief erases the memory of confusion that the streets had left into view. The Sandbanks provide a panoramic view of the Majestic Ghat façade, which enable visitors to appreciate the magnificence of this holy landscape.

Recreational activities like Camel and Horse rides are attracting more tourists to this area. A few commercial shops to support the small-scale activities, which takes place in the sandbanks, have brought some life to this nomadic landscape. People were charged over the Maximum Retail Price considering the transportation costs involved, highlighting the requirement of infrastructure and facilities to support the commercial activities here on the sandbanks. Families and teens could be seen bathing and enjoying the serenity and calmness of river Ganga away from the chaos and congestion on the Ghats. These activities happen year round except in the monsoon when the sandbanks are submerged.



Figure 7.3 Activities

The soil is mostly sandy or a sandy loam and not an ideal medium for vegetation growth. Furthermore, it is not appropriate for building, as it does not have much support. Fertile silt deposits were found along the outer edge of the riverbanks. The soil becomes coarser and hard as we move inwards. The fresh alluvial deposits have been utilized for cultivation of Mustards and the heavy dosage of fertilizers have made these soil turn hard. The surface is inundated during monsoon and thus are replenished with fresh soil deposits. This cycle continues which helps in balancing the alluvial deposits along the riverbanks but invariably polluting the river downstream with harmful chemicals present in the fertilizers.



Figure 7.4 Changing Landscape

Day 2 & 3 – Villages

The green belt area and nearby villages are rich with a wide variety of flora forming the outer edge of the sandbanks. Babul trees dominate the green belt, which stands on a higher plateau acting as a natural boundary to River Ganga. This species of trees are the cheapest source of wood for cremations and the tribal people from the inner parts of Ramnagar are the main customers.

There are no major establishments in the area except for two or three Ashrams. Major share of the land is utilized for wheat and vegetables cultivation with sparse settlements. Unpaved and dusty roads shows a very different picture of Varanasi owing to the belief in inauspiciousness of the Ramnagar side. There are two bridges which mark the end of the crescent shaped sandbanks. Nomadic settlements were found around the two key infrastructures, whose activities are based on Bamboo weaving near Malviya Bridge and temporary farming based near the Ramnagar bridge. The seasonal farming of watermelon, bitter gourd, and other green leafy vegetables were found here.



Figure 7.5 Farmlands

Day 4 – Ramnagar

The Ramnagar Bridge, which was recently opened to the public, have increased the traffic in the Fort Road, but has not brought much increase in commercialization of the space. The Ramnagar Fort, attracts local and foreign tourists and there are a few supporting commercial activities around it. Other than that, Ramnagar area have mainly rural households, most of whose living is based in agriculture and animal husbandry.

Drains could be found flowing into Ganga carrying harmful chemicals from the farmlands and other debris from the settlements around it and thus polluting the holy river. The uninhabited area under the Ramnagar Bridge is used as a dumping site clearly indicating Solid Waste Management inefficiencies. All of these contribute in making this area highly polluted.

Day 5 & 6 – Boat Ride

Boat ride along the river gave a spectacular view of the Ghats standing tall along the west banks of River Ganga. The boatmen shared their views on sandbanks and how it changes over different times of the year. On the way downstream it was found that some of the Ghats have been sinking in to the river. An interesting story unveiled once we started exploring the possible reasons behind the collapse. Prohibition on sand mining was found as one major reason. This was due to the presence of Tortoise Sanctuary in this stretch which was started in 1989 as part of Ganga Action Plan- phase I. The Sanctuary has its own importance to clean the water especially in the ManiKarnika Ghat area where the tortoises eat the remains of the cremated bodies thrown into the holy river.



Figure 7.6 Collapsing Ghats (near ManiKarnika)

Authorities claim that sanctuary is home to different species like *Aspiderites Gangetic* (self-shell turtles), *Geoclamis*, *Hamiltonai*, *ChitraIndica* and *Lasimous* which are carnivorous tortoises and hard shelled herbivorous tortoise- *Pechra*. Tortoise and all other aquatic species are protected and fishing or any attempt to temper with the habitat of the animals found in the Sanctuary, has been declared a cognizable offence in this stretch of the River Ganges, under 1972 Act. Motor boats and sand mining in the protected zone of the Sanctuary is prohibited. But the locals and the boatmen community say that in reality, turtles are never seen in the Ganges, but in the name of prevention it is continuing.

It is studied from previous researches that sand deposition varies year-to-year that may depends on the discharge and flow velocity change due to climate change. Such changes distort the natural quasi equilibrium of the river; in the process of restoring the equilibrium, the river will adjust to the new conditions by changing its slope, roughness, bed material size, cross sectional shape, or meandering pattern (Sabita Madhvi Singh, 2014). More sand is deposited each year reducing the river cross section by which the flow velocity increases and carries away the soil underneath along with it. The prohibition of sand mining in the area because of the tortoise sanctuary have worsened this problem. The Ghat collapse happen because of this weakened base, which stresses the need for some quick actions.

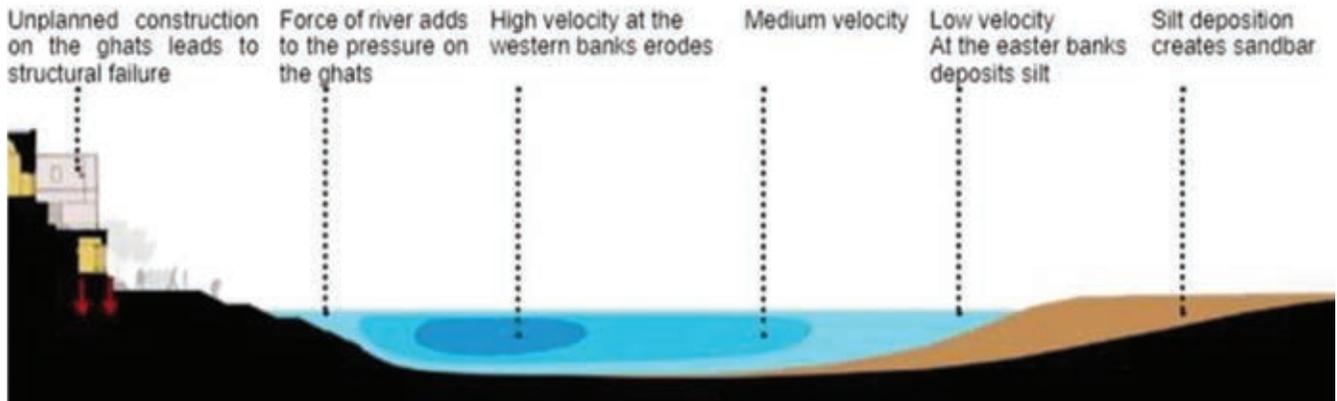


Figure 7.7 Cross sectional view

7.5 SWOT Analysis

With an understanding of the rich culture of Varanasi and its people, we have reached out to a variety of people to discuss the outcomes of our SWOT and their vision to identify possible interventions. They stressed on the importance of practically implementable solutions, the benefits of which should have a multiplier effect on the well-being of society, and which would be tangible in the short to medium term.

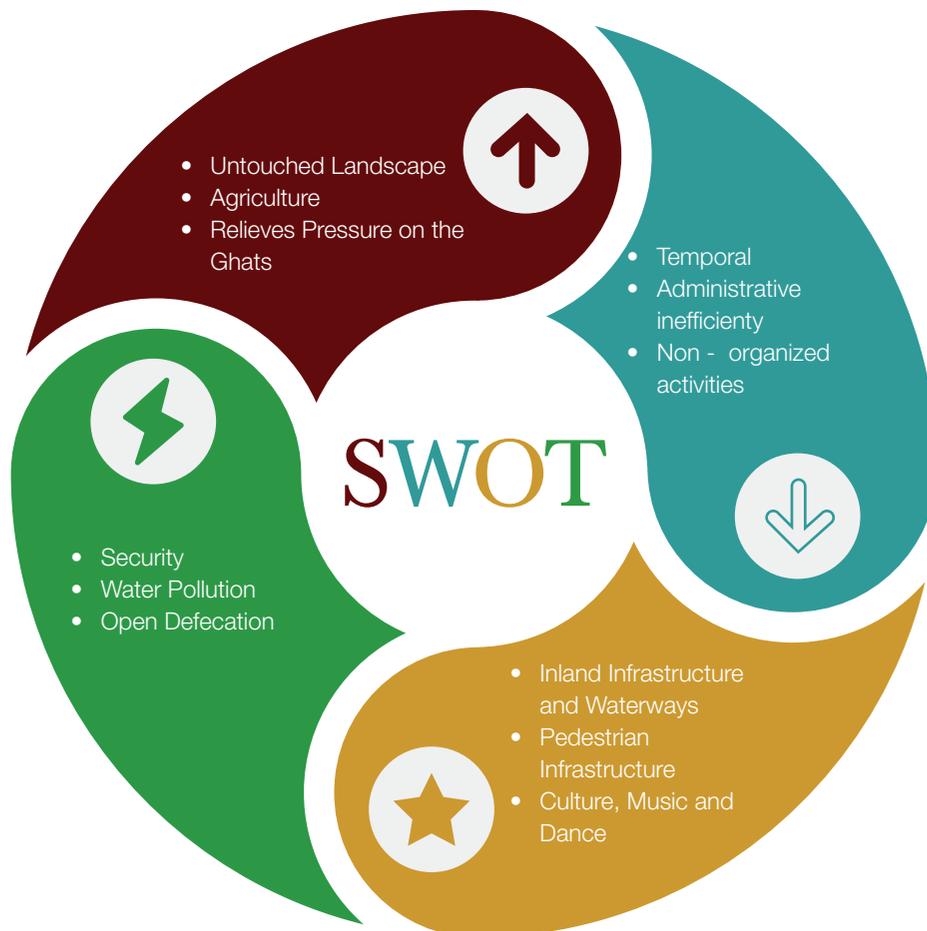


Figure 7.8 SWOT Analysis

The informal settlements close to the edges of the sandbanks have very limited sewerage system. Due to which most of them resort to open defecation making northern and southern edges of the sandbanks a pollution hotspot in the holy city. Besides the wastewater from the settlements and farmlands adds to the pollution woe. The vast Sandbank stretch can be planted with grasses for bio-filtration to occur which can help in natural cleansing of the river.

The streets in the old city area are so narrow that effective emergency response during fire and earthquake, are difficult to be taken. This problem is aggravated during major bathing festival. Since it is nearly impossible to create a quick response route through the narrow lanes, the best alternative is to develop a waterway for water ambulances. The sandbanks can serve as an open evacuation area as part of the emergency infrastructure being developed. Self-adjusting Jetties and inland waterway terminals can be developed on the outer edges of the sandbanks for water transport modes like Amphibuses and Cargo Vessels.

The recently proposed Inland Waterway Infrastructure for Varanasi (IWA) poses a threat or a challenge has to be carefully studied. Unlike many of the world's major watercourses, the Ganga is a seasonal river that swells with the monsoon rains and recedes in the dry winters. While small boats can indeed ply along this seasonal river, large cargo barges need a minimum depth to sail in. The EIA Clearance despite the existence of Tortoise Sanctuary and other legal hurdles associated with a heritage city like Varanasi was clearly because of the importance of this project and the positive impacts it can have on the people and infrastructure along the river. Sand dredging will increase the width of the river flow and lessen the pressure on the west bank. Besides the less intrusive dredging techniques like water injection method can help in stabilizing the natural riverbed, which can address the issue of collapsing Ghats to a large extent.



Figure 7.9 Flywheel of activities

A cycle of activities was proposed by the team based on the findings in the landscape.

- The commercial, recreational and cultural cycle, which can be organized on the sandbanks in relation with the Festivals and activities happening on the Varanasi side.
- Agricultural activities with sowing and harvesting timeline considering suitability of the crops and availability of alluvial deposits.

Both these proposals are subject to change and can be considered as a flywheel (figure) rotating with time and place. Design intervention should take into account the flooding periods as well as the process of erosion and deposition. The months with heavy rainfall with higher flooding chances are shown with blue sectors (not to scale) indicating the non-availability of the sandbanks.

The proposal depicts how this shifting fluvial landscape can be developed into a public space that can be used intensively in the dry season for recreational activities thus alleviating the stress on the Ghats. Besides seasonal farming can be organized on the southern part of the east bank where the flood plain soils can support vegetables and fruits cultivations.

7.6 Conclusion

Strategic focus of the Sandbank and its surroundings was derived from the SWOT and terrain analysis, ensuring to capitalize on the strength and the opportunities of this land and mitigating its threats and weakness. SWOT analysis, which is derived from the observations, citizen consultations and expert opinions (Jan 13, 2018) indicates its strength and opportunities as an agricultural space and a tourist spot relieving the pressure on the Ghats. On the other hand, temporality and lack of several urban facilities emerges as the weakness and threats of this land. In this background, the strategic focus of Sandbanks should be in:

- Developing the basic facilities to promote the agricultural activities, which owns a major share of the land use.
- Organizing and networking of the activities and people in an around the sandbanks with promoting non- motorized modes and pedestrian infrastructure for tourists.
- Creating Infrastructure for multimodal transportation and emergency routes along waterways where sandbanks can play a supporting role.

Sandbanks being a temporal landscape unavailable during monsoons and Ramnagar being considered as the inauspicious part of Varanasi, there is a need for government initiative, guidelines and public participation for the systematic development and preservation of this area.

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Epilogue

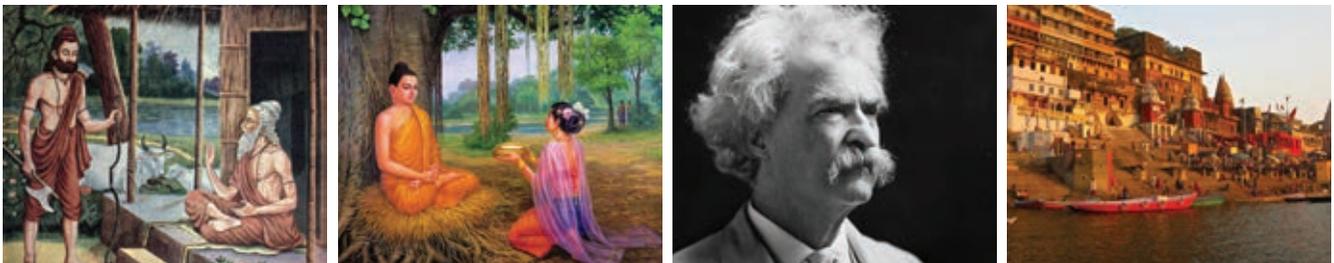
Varanasi Design Studio as a collaborative exercise has been a learning experience for students and faculty members from all the participating institutions (Graduate School of Architecture, Planning, and Preservation (GSAPP), Columbia University, New York City, USA; Ranbir and Chitra Gupta School of Infrastructure Design and Management and the Department of Architecture and Regional Planning, IIT Kharagpur; and IIT (BHU) and BHU, Varanasi). Students' exchange has helped us to realize that approaches to planning and design can be, and shall be, multifaceted. We hope to get associated with similar collaborative design and planning studios with institutes of international repute in the coming years as well.

Varanasi

Its unfathomable genesis

One of the oldest references of Kashi – ‘The city of eternal divine light’ emanates from the legacy of King-Sage Divodasa, whose pioneering lineage finds an exemplary mention in the Rig Veda where the City becomes a microcosm of all universal godheads (Viswadevas). From that time of remote antiquity, the line of kings which ruled Kashi and the Mauryan dynasty, an empire that ruled the Indian sub-continent from 320 BCE to 185 BCE claimed descent from Kusha, who descends from the Ramayana. The Rig Vedic Kaushitaki-Brahmana Upanishad refers to a dialogue between a Gargya generation Brahmin named Balaka, and an older King named Ajatsatru, the then emperor of Kashi. The story is also mentioned in one of the most antique of all Upanishads, the Sukla Yajur-vedic Vrihad Aranyak Upanishad 2.1 and the place ‘Kashi’ is re-mentioned in the same Upanishad 3.8.2. Additionally, the Atharva Vedic Pranagni-hotra Upanishad bears a direct reference to Kashi in the name of ‘Varanasi’. Thousands of years, another emperor by the same name Ajatsatru, rules parts of greater Kashi, who was also contemporary to Gautama the Buddha and Mahavira the Tirthankara.

The Adi Parva of the Mahabharata narrates about Amba’s swayamvara, who was the eldest daughter of the king of Kashi (Varanasi), who organized a swayamvara (a ceremony of choosing a husband from among assembled suitors by the bride) for his three daughters which was organized by Bhishma, the son of the Kuru King Shantanu of Hastinapur and his wife Ganga, the living goddess - the spirit of river Ganges (called Ganga in India). Of the later Puranas, there are special mention in the various chapters of the Agni Purana (119); the Padma Purana (14.191); the Kurma Purana (1,31,35); Matsya Purana (191); Linga Purana (92); and particularly, at length, in the entire fourth chapter of the Skanda purana, which is called ‘Kasi Mahatyam’ (the Glory of Varanasi). The Buddhist Anguttara Nikaya (100 BCE), at several places gives a list of sixteen great nations or regional confederations of which one is Kashi. The Digha Nikaya or ‘Collection of Long Discourses’ is a Buddhist scripture, the first of the five nikayas, or collections, in the Sutta Pitaka, which is one of the ‘three baskets’ that compose the Pali Tipitaka of Theravada Buddhism, also mentions Kashi as a predominant confederation. The Jaina Bhagavati Sutra (300 AD) also mentions Kashi as one of the sixteen Mahajanapadas.



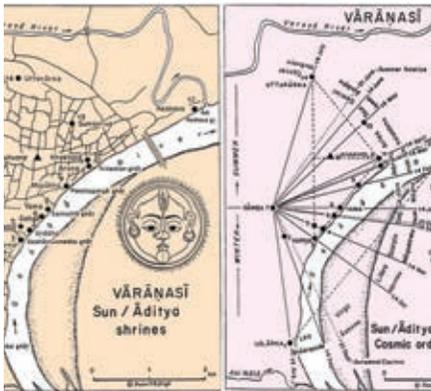
A very important event is the coming in of Siddhartha the Gautama to Varanasi looking to revive its sacred cosmic geography, turn the ‘wheel of dhamma’, and re-establish its green paradise for the Sages (Rishipatana), called ‘Saranath’ (Mrigadave or Deer’s park), and named after the Unicorn Sage of Ramayana, Saranganath or Rishya-Sringa. From that archaic period to centuries till date, Varanasi, India’s celebrated Spiritual Capital has continuously unfolded within a single bud (Karnika) an uninterrupted and sustainable urban lineage constituting many layers, embedding many traditions, and Assi milating many schools of spiritual and intellectual legacies. As celebrated American Humorist-explorer Mark Twain commented after experiencing Varanasi:

“Varanasi is older than history, older than tradition, older even than legend, and looks twice as old as all of them put together.”

Now, a Pan-IIT-SPA joint initiative is heading forth to take up Varanasi: as a mega-exploratory project. The goal is to explore in full depth a four phased design recovery (cybernetics), encompassing the entire flow of Varanasi’s unique land-river interface at all levels of eco-innovation.

Varanasi

a recovery of her sacred geography



Varanasi at
Physical Cartesian
Level
Reductionist



A Sacred Geography
Recreate a deep ecosystem of creative economic clusters and craft clusters based on heritage and spiritual tourism revivals

Varanasi at
Mental Ritual Level
Observational
/ Participatory



Evolving a network of self-monitored sustainable green habitat system based on 'Sandhi' approach to solar energy and bio-energy simulation and re-uses

Varanasi at
Cognitive
Meditative Level
Co-evolutional



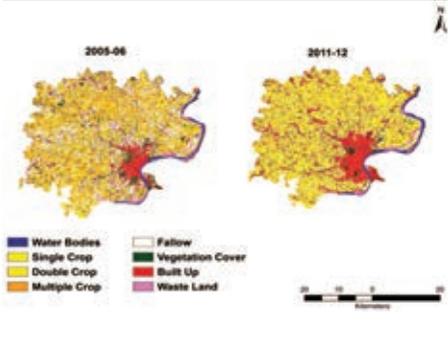
Augmenting a network of large Knowledge centers in the inner ring of the city from BHU and other Innovation Hubs: ecological ethics to deep ecological pursuits

Varanasi at Cosmic
All-pervasive
Cybernetics IV
Level
Integral



Diagnosing land-water-air pollution mitigation and demonstrate environmental upgradation through creation of city's new ecosystem – sustainable technologies for green construction

In summary: Sandhi of Future of Varanasi City Themes

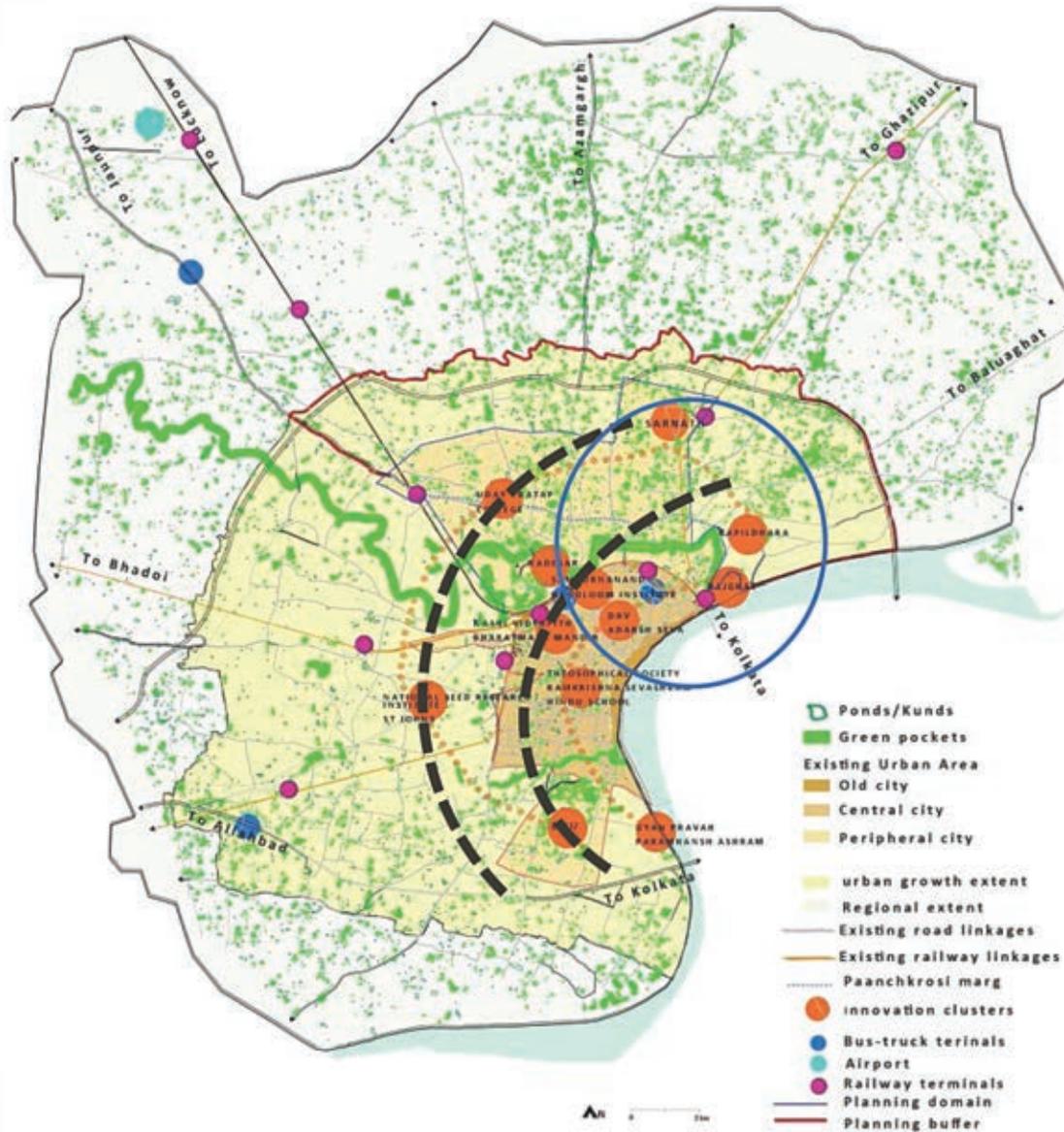
<p>Project 1 on Ganga Origin, flow and destination: Heritage tourism</p>	<p>Project 2 on Future of Cities Livable flow of urban systems</p>
<p>Project 3 on Creative communities and the river: Creative flow of tourism</p>	<p>Project 3 and 4 on Music & Iconography Rig Veda:::Ramayana:::Sufism Epigraphy & archaeology (Indian Muses) Revive a flow of Scientific (natural-cosmic and anthropic-anthropometric) Traditional Knowledge systems</p>
	<p>Project 5 on SARNATH & VINDHYAS Origin of Buddhism & others... Reconstruction of continuity & flow</p>

Varanasi-Specific Exploratory Initiatives

Study of Flows	'Water' and capacity Building of boat-based Tourism in the context of Varanasi, and its spirituality and culture
Capacity building of Urban Livelihood Urban Renewal Mission project	Living creative communities of Varanasi On Varanasi's urban design, various public spaces around ghats, network planning, pedestrian micro zoning, and urban services and transportation engineering
Urban Heritage Mission on temples and people	Urban Heritage Mission on temples and people and their behavior at market place based on creative communities, their work places, their graphic designs, as well as social relations within and outside the community
Urban Epigraphy documentation, dissemination and cultural studies	Sacred texts and their parampara from the city of Varanasi having national as well as universal complementarities
World Heritage and Eco-tourism Mission project around the twin centres of Varanasi-Sarnath	Based on Art, Cultural studies, Iconography, philosophy, history and sciences – based on related Buddhist communities of Tibet, Bhutan, SE Asian countries and Japan, Korea and China
Capacity Building and Recognition Programs and Institutional Augmentation Workshops	Based on Ayurvedic traditions, Musical traditions, Epigraphy recitation tradition in relation with Guilds, Patronage & Popular themes of Varanasi
Creation and Capacity Building of Varanasi Integrated Informatics and Analytics Lab	To promote the City Scope as a Living Continuity of Indian Habitat Tradition and Heritage

The 8 Micro Proposals

Joint venture of IIT BHU and IIT Kharagpur, 2017-18



The core concern
Livable land-use planning & efficient-infrastructure

1	Activation of Heritage trail, Varanasi - Case of 500 meters, Panch Ganga Ghat
2	Augmentation of NODE 1, Urban Ecosystem Innovation, Case of Raj Ghat trail
3	Meditation App Development using Feedback from Various Varanasi Meditation Traditions
4	Urban Creative Cluster augmentation in Varanasi

5	Innovative Exhibition in IIT BHU campus based on Iconography & Epigraphic studies
6	Old Age Homes in Varanasi: Exploring a Sustainable and integrated Financial Model
7	Developing a Pedestrian Master Plan for the City of Varanasi: Piloting a stretch
8	To Improve End-of-Life Care by Reconfiguring Old Age Homes (OAHs) in Varanasi



*All action is prayer. All trees are
desire-fulfilling. All water is the
Ganga. All land is Varanasi. Love
everything.*



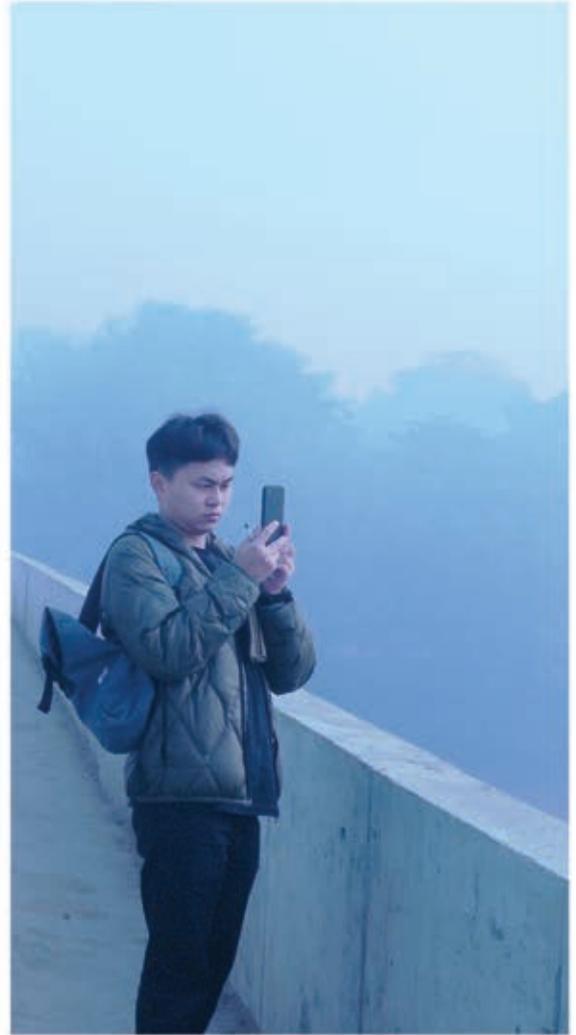
Neem Karoli Baba

Picture Gallery

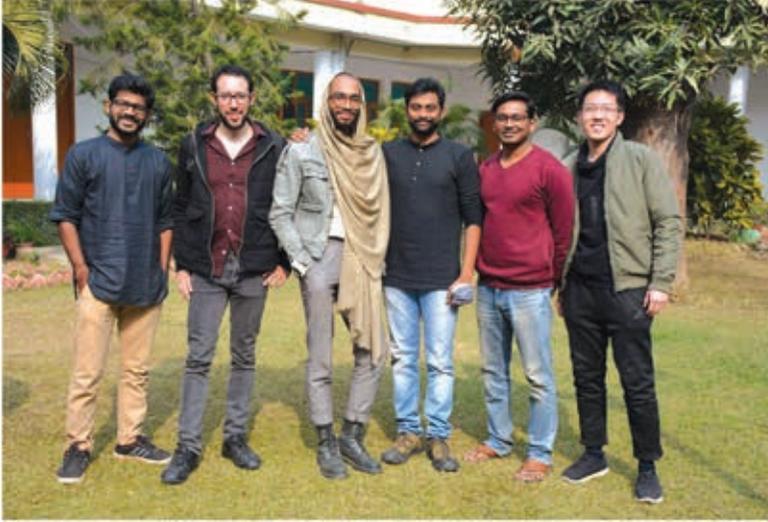












End-Term Review Presentation

**Indian Consulate,
New York City, USA
3rd May, 2018**

End-Term Review Presentation

Indian Consulate, New York City, USA

3rd May, 2018

Preface

Of the entire team of 24 students from IIT Kharagpur who participated in the urban design studio on Water Urbanism in Varanasi with GSAPP, twelve were selected to travel to New York and participate in the end-term review presentation held on 3rd May, 2018.

The delegation from IIT Kharagpur had reached few days in advance. Students from IIT met their counterparts from respective groups at the Columbia University campus to discuss the progress of work and accordingly prepare for the end-term presentation.

At the kind invitation of the Consul General of India in New York – Mr. Sandeep Chakravorty, the presentations were held at the Indian Consulate in New York in the afternoon of 3rd May, 2018. At the onset, the Consul General of India welcomed both the participants and invited members in the audience. This was followed by briefings made by studio coordinators from both GSAPP and IIT Kharagpur. Several academicians and professionals were invited for the review by studio coordinators from GSAPP; and they were from the city of New York, other parts of the USA and beyond, and even from India.

Following themes were presented by participating groups.

1. **Forest of Bliss:** Restoring Varanasi to a Forest of Bliss
2. **Life and death cycle:** Decentralizing Manikarnika Ghat by creating ‘fingers’ of cremation on the sandbank/ Ramnagar side
3. **Reimagining the Assi Nallah:** Re-imagining the Assi Nallah as a productive, cultivating landscape and creating a self-sustaining community
4. **High ground Low ground:** Looking at the development happening south of Ramnagar Bridge and east of BHU and the potential of flood proofing the area
5. **Four commons:** Varuna River as a cleansing biotope
6. **Varanasi in flux:** Accommodating the flux by integrating maidan spaces
7. **Trans-aggregation:** Micro transactions to macro change

Each group of students from GSSAP introduced the theme by showing a short clip, followed by discussing the design proposal. Respective posters elaborating on the proposed design were displayed in the hall during the presentation. After each presentation, respective students from IIT Kharagpur briefly presented additional inputs from the dais. It was followed by observations made by invited experts.

Additionally, in the morning-half of 3rd May, the delegation from IIT Kharagpur had also attended the end-term review for the urban design studio on ‘Water Urbanism in Amman / Aqaba’ held at the Avery Hall in the campus of Columbia University.

Group 1- Forest of Bliss: Restoring Varanasi to a Forest of Bliss

GSAPP Students: David Chonillo, Gigi Singh, and Jorge Espinosa

IIT KGP Students: Vidhu Pandey and Aarsi Desai

The topic chosen by the group for their final design evolution was ‘Forest of Bliss’. In this they came up with a concept of introducing tree planting as a new ritual based on the already existing ritualistic and spiritualistic outlay of the city. Conceptually, the new ritual would engage the pilgrim routes as channels of flow through which pilgrims move with the planting process. Here, temples would act as the distributing Hub by incorporating nurseries of the indigenous plants in their premises. The priest and saints would act as mobilisers in promoting this ritual as a part of the sacred ceremonies performed by the pilgrims while their visit to temples. The phase wise induction of this ritual would eventually help in gradual restoration of Varanasi to its initial state of *Ananda Van* or Forest of Bliss.

Varanasi is a historical city with deep spiritual and religious values ingrained in its urban fabric. Nonetheless it is like every other city which is trying to cope up with rapid urbanisation which has impacted its physical, social and economic scenario. The concept provided by the team had a unique outlook to the very serious problem of declining green spaces in the city.

Varanasi is a city of people who are deeply attached with their ritualistic heritage. A city so ardent in following its beliefs seldom accepts sudden changes. This concept theoretically proposes inclusion of new rituals in the sacred ceremonies which have been performed since ancient times. It also proposes a shift from the contemporary urbanised times to the times when the city was a part of a forest i.e. *Ananda Van*, an idea that was prominent in history as the legendary forest which gave enlightenment to many. A highly forested city might not be able to cater to the needs of the modern civilization yet a balance of open and built spaces are prerequisite for any healthy city.

Hence, a more effective manner to execute this idea would be converting it into more grounded policies and action plans that might improve the state of open and green space and be able to give in some green lungs this vibrant city. The project still needs to be executed in phase wise manner and should preferably be started from peripheral areas as they are comparatively new settlements and would be less reluctant to change and then moving towards the inner city which is the heart of these spiritual and religious ceremonies. The project definitely infuses a new perspective to the conventional problem solving and can definitely be modified to suit the modern needs of this ancient city.

Group 2 - Life and Death Cycle: Decentralizing Manikarnika Ghat by creating 'fingers' of cremation on the sandbank/ Ramnagar side

GSAPP Students: Zenan Guo, Yiqi Mei, and Tzu-Ying Chuang

IIT KGP Student: Anuradha Chakrabarti

In cities of the global south water is more than a resource, need, desire or a medium to enhance aesthetics. Here, water is a way of life. An explicit and implicit belief system woven into space, which acts as a spring bed for a unique tangible and intangible culture mired in it. In Varanasi, impressed to be the oldest living space in India, that is the case. Here, an intricate network of flow and constant water has conjured a different kind of ecosystem, which superficially appears as vibrant and serene, but, is embedded in myriad complicacies of mismatch between need and desire.

On the one hand, the holy river Ganga and its tributaries, at times uncovering the sewage network, constitute the system of flows. On the other hand, the region is interspersed with holding water systems of the *kunds* which are a unique ecology in this space. Beauty, serenity, and multi-functionality of 'Ghats'(stepped embankment reaching up to the water) give way to narrow lanes dotted with houses on both sides interspersed with informal economic activities that not only enhance the vibrancy of the mundane life, but also explicitly, or implicitly, exhibit their influence.

The fascinating history of each Ghat is associated to the activities in it and is supported by a mythological belief that is generally associated with some Hindu god or goddesses. Manikarnika Ghat amongst them is one Ghat that draws people from near and far. It is believed that the soul of the deceased receive 'moksha' or salvation if the last rights are performed in this Ghat. This belief draws people from everywhere. However, the ecological impacts of this belief are costing a speedy deterioration of the water of the Ganga river. Reports show, daily approximately 60,000 devotees take holy bath in the river Ganga. Another study in 2014 shows that in the year 2012, 300 tonnes of half-burnt flesh was released in the river Ganga along with about 3,250 bodies of adults and children and 6,000 animal carcasses.

In this context the proposal of the group was to decentralise the burning activity of the Manikarnika Ghat to the opposite side of the river bank. Interesting part was how wood was proposed to grow in situ for burning bodies which currently is imported from some remote forest in Madhya Pradesh. The design of the spaces where the burning ceremony is likely to take place also looks contextually appropriate. The idea of a stepped approach leaving a considerable buffer from the river is likely to protect the river from polluting activities. Overall the design looks convincing and pertinent given the current issues due to burning practices.

However, incorporating sensitivity issues and the contextual realities in the design plan appears as the biggest challenge. Acceptance of the project from an economic, social and cultural perspective looks challenging. Culturally the entire system works on a network of belief. Therefore, important is to keep the connection with Manikarnika Ghat active. Economically, the Ghat provides livelihood to significant number of households near and far. Simply transferring major activities to the other side can create an ambience of conflict of interest.

Integration of the old/existing with the new was weak. How the old can facilitate the new could be an important aspect to be included in the design. The plan is not to uproot the urbanism that has developed over the years around water but how we change the urban way of life and successfully incorporate the past with the present. Surely, the design needs to be radical but also important to remember is how we make people connect to it from an everyday life perspective. The only way to incorporate all of this is to engage communities of both the banks in bringing the design to life. The new design should not pose as a challenge to the existing set up but should support the existing economies and improve community consciousness about the current state of Manikarnika Ghat and the opposite Ghat to develop a conducive environment.

Group 3 - Re-Imagining the Assi Nallah: *Re-imagining the Assi Nallah as a productive, cultivating landscape and creating a self-sustaining community*

GSAPP Students: Jesse Hirakawa, Fah Kanjanavanit, Xiaofei Huang, and Shih Hao Liao

IIT KGP Students: Dipanjan Nag and Naushad Ahmad

Ganga holds a consecrated place in the birth of Varanasi as a religious centre. The hallowed river is worshipped and celebrated, in the city, as the goddess mother who blesses her ominous children with the promise of joy and prosperity. Ganga is thus the epitome of purity and sanctity, however, contrary to these adjectives, it is ironical to see Ganga being ravaged by practices which leaves Her dirty. The primary tenet behind the study was to clean Ganga for the sake of its religious and spiritual significance which is embedded in the very fabric of this city

Varanasi grew within the extent of Varuna (in the North) & Assi (in the South), hence the name (~Varan-asi). Varuna is wider in width compared to Assi which intuitively asserts to be the reason why Assi was treated more of a Nallah (a drain). These smaller tributaries open into the Ganga carrying a lot of waste and thereby making Ganga impure even further. Out of these two, Assi was taken up which can easily be said to be in a worse shape

The study investigates the sewer infrastructure of the city and notices how it is inefficient, and will reach capacity in the near future—in spite of the infrastructural expansion under the Ganga Action Plan & JNNURM. Thus proposals for water-centric planning was recommended as the need of the hour. Design interventions were suggested which will not only be ecologically beneficial to the water systems but will be socially beneficial to the communities. Taking advantage of the natural ecosystem of the kunds and the water bodies in and around Assi Nallah design interventions were proposed which consists of filtration landscapes, cultivation and community engagement. Filtration landscapes with the usage of various flora & fauna, helps in cleansing of the waterbody—cultivation in the form of pisciculture and other aquatic cultivation will help in deeming the landscape to be a productive one and the community will take care of such infrastructure once they see the benefits that is being generated from such infrastructure. Thus these three elements will be instrumental in forging a new ecosystem which will not only be beneficial to the actors/users but also to the surroundings.

The extent of such a system and its compliance to the norms and policies of the local authority, social structure etc. could be cited as limitations to the study, however it is to be noted that these aspects deals with technicalities and require in-depth response elicitation and thus could be deemed out of the scope of this study. This study is more of a concept note which will need further detail for implementable groundwork.

Group 4 - High Ground Low Ground: *Looking at the development happening south of Ramnagar Bridge and east of BHU and the potential of flood proofing the area*

GSAPP Students: Caroline Jeon, Yeonkyu Park, Yuqi Cui, and Shimry Bao

IIT KGP Students: Arpan Paul and Shrivani Wattamwar

Varanasi, also known as Benares, is one of the major religious hub in India. Tourism and pilgrimage plays an important role in the city's economy. But from its geo-morphological settings Varanasi is situated in a vulnerable location along the left crescent-shaped bank of the Ganges, averaging between 15 meters and 21 meters above the river. With the Ganga showing no marks of acceding, Varanasi is facing flood situation for the last few years. The Varuna, a tributary of the Ganga, is also swelling. The state at Assi Ghat is same as well. These are the major causes of the flood situation in the city. For the last few years the flood waters entered into newly developed areas around the eastern part of the Banaras Hindu University (BHU), Varanasi and disrupts the livelihood of these areas.

This team of Varanasi Water Urbanism, 2018 has done a short investigation on the development happening south of Ramnagar Bridge and east of BHU and the potential of flood proofing the area. The major comments are:

- Floods in Varanasi have forced a halt to cremations along the banks of the river Ganges. Most of the Ghats have drowned during the monsoon. At that time many people have carried out cremations on the terrace roofs of houses in the city. This always makes a negative impact on the neighbourhood environment and the quality of life of the communities.
- The roads of Varanasi are waterlogged leading to massive traffic congestions. Most of the residents from these locations have been forced to move to safer locations in other parts of the city.
- Feeble infrastructure and inadequate government response is making Varanasi drown.
- The haphazard encroachment near the ravines merging in Ganga has added to the problem. The woes of the city appear to be far from over as the water level in Ganga shows no signs of receding.
- Besides Ganga, Varanasi's another major river Varuna is also flowing above the danger mark. Due to monsoon a lots of houses along the river banks have been inundated. Though the government has publicized special attention in developing a tourism corridor alongside Varuna River, so the present urban governance should take some initiation for policy implementations and design innovations to overcome these issues.

Group 5 - Four Commons: *Varuna River as a cleansing biotope*

GSAPP Students: Faisal Alzakari, Ruilan Jia, Xiaohan Wang, and Hilary Ye

IIT KGP Student: Debanjan Kayal

Varanasi the city of temples, which once thrived between the Assi and Varuna River along the Ganges is today facing a multitude of difficulties and health problems cause of the water which has become so polluted as a result of anthropogenic causes. The main aim of this study was to find a solution to make this tragedy into an opportunity. So the four commons in the form of water were identified: Cloud, Kund, Nallah, Aquifer and these sources were then studied and analyzed on how it had an impact on the lives of the people.

- The first one was Cloud which had an adverse impact on rainwater as the air pollution levels in the city were quite alarming so to cut down on this cleaner fuel and strict vehicle management system was necessary.
- The second one is Kund which are now overlooked and some places are used as a dumpsite. The intervention here needs to be as for how to incorporate the common people living around them have an ownership of it so that they become a clean source of water and an open gathering space for the neighborhood. So the analysis here was done to find out was how the Kunds can be made to hold water and how their cultural value can be restored.
- The nallah needs to be treated and can be made use of a water system by integrating it with its immediate surrounding rather than just a drain to carry the wastewater into the Ganges.
- The final one was the aquifer which is presently being overexploited without a thought for recharging. So the thought here was how to preserve it and use it in a sustainable way.

The analysis which comes out of all this is that the Varuna shouldn't be thought of as a sewer line and the general trend of urbanization needs to be replaced here with riverization.

So the study area which takes into account two very contradicting situation and yet integrating it with a river-centric design by taking into opportunities and threat a sustainable solution has been achieved. The terracing farming method advocated in the design will not only decrease the chances of the flood but also increase the recharging of the groundwater table. It will also enhance the Organic Carbon Density (OCD) level of the soil during the monsoon thereby making it more fertile. The best part about this design is how the ecology has been integrated with the livelihood of the people. When people become the stakeholder only then they take care of the surrounding and it is then that a planning theory becomes successful.

Group 6 - Varanasi in Flux: Accommodating the flux by integrating maidan spaces

GSAPP Students: Ban Edilbi, Fatma Mhmood, Xianyao (Chris) Xia, and Huanyu Chen

IIT KGP Students: Thaju Zaman and Sunny Bansal

Varanasi is a land of festivals and has various traditions related with these festivals. The festivals occur round the year with significant rituals as per the seasons or the seasonal changes. Also, the holy city is a major religious hub for various religious beliefs of India and abroad. Geographically, the city holds a prominent location at the Indo-Gangetic Plains. All these and few others factors bring in a flux of people, birds, flora, and water to the city throughout the year in repeated cycles. The central theme or issue identified for the design studio was to accommodate this flux of people, birds, flora and water in Varanasi. This was proposed by integrating '*maidan*' spaces into Ghats, parks, and kunds in self-sustaining way. Major observations from the final presentation are listed below:

- The understating of the concept of '*maidan*' is an exemplary effort. The *maidans* or esplanades have always played a big role in integration of various activities like public gathering, recreation, fairs and other events organisation. To revive the same practice in a city like Varanasi is a bright and feasible solution.
- The inclusion of the flux of water is an interesting perception as water is both, the actor and the catalyst, in the realm of water urbanism.
- The integration of *maidan* spaces is exemplified with three different case-studies of a trajectory including a park (Benia Park), a kund (Pishach Mochan Kund), Ghats and sandbanks (Ramnagar) side. How these spaces will be transformed for different peaks to accommodate flux is strategically planned and designed.
- The design proposal involved a lot of sensitivity as the cycles of flux were not identified and portrayed as calendar cycles but as seasonal and cultural cycles of Varanasi. This showed the insights and depth of the thoughts behind the design interventions.
- Striking a balance between the soft infrastructure systems proposed for the riverfront and sandbanks with the hard infrastructure construction underway for the National Waterway 1 through the same stretch can reduce a lot of environmental impacts and aid the city's vision for smart and green infrastructure.

Group 7 - Trans-aggregation: Micro transactions to macro change

GSAPP Students: Donovan Dunkley, Sofia Valdivieso, Niomi Shah, and Saritza Martinez Rodriguez

IIT KGP Students: Jyoti Kiran and Deepanjan Saha

The team from Columbia University has studied the complex web of economic and non-economic informal transactions which have evolved in the city of Varanasi over time. Such informal networks engage different occupational groups or communities wherein the same profession is passed over generations. Of many, the team has studied three communities in detail, namely, boatmen, potters, and street-vendors. The team has formulated an aggregated cycle of transactions by binding the actions of these three communities in proposing physical design solutions for few issues intrinsic to the development of Varanasi. In doing so, the team has exploited indigenously developed skills protected within each of the selecte communities; for instance, boatmen community's long-term association with the river is being channelled to keep the river clean by collecting waste floating on the river; weaving skill of those who weave baskets has been used to build screens for bathers which may be erected at the riverfront.

- IIT respondents have made following additional observations at the final review, which may be considered for further research.
- Each of the occupational groups being studied are strongly characterized by respective social class, or caste-based identities, which need be considered, and so is their hierarchical structures.
- Each of the occupational groups has a distinct community-level association which is headed by a local communal leader (i.e. 'sardar', 'mukhiya', or 'mahato'). Such a leader holds an honorary (non-elected) position which is typically passed over generations in the same family. Such leaders may be considered to be engaged in the drafting process of proposed design solutions. Routing the proposals through such leaders may lead to their better acceptance among the targeted communities.
- Since traditionally evolved skills specific to each of these occupational groups are being used for new activities, a gradual yet rigorous capacity building programme need be framed by involving local master craftsmen, or expert artisans.
- Involving each and every player on the ghat in some process or the other will empower them and make them indispensable part of the whole system which might help in loosening the caste based biases and make it more "work" based need of those players.









*“I would love to live near Haridwar or
Varanasi, since they are such holy spots
for Hinduism.”*



Julia Roberts

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NOTE: The WATER URBANISM STUDIO jointly conducted by GSAPP COLUMBIA UNIVERSITY USA and IIT KHARAGPUR is a part of the PROJECT VARANASI initiative, which is an integral part of THE SCIENCE AND HERITAGE INITIATIVE (SandHI) of IIT KHARAGPUR.



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