Master's thesis

NTNU
Norwegian University of Science and Technology
Faculty of Architecture and Design
Department of Architecture and Planning

Alvira Shrestha

Rejuvenating the Balkhu-Sanchal riverscape

Merging the 'green' and 'brown' agendas towards creating a positive 'image'

Master's thesis in Urban Ecological Planning
Supervisor: Prof. Hans Christie Bjonness
June 2021

NTNU
Kunnskap for en bedre verden

Alvira Shrestha

Rejuvenating the Balkhu-Sanchal riverscape

Merging the 'green' and 'brown' agendas towards creating a positive 'image'

Master's thesis in Urban Ecological Planning
Supervisor: Prof. Hans Christie Bjonness
June 2021

Norwegian University of Science and Technology
Faculty of Architecture and Design
Department of Architecture and Planning

NTNU
Norwegian University of
Science and Technology

Abstract

Like many original cities, Kathmandu in Nepal was formed around the mighty Bagmati river. Flowing down from the very Himalayas, its water was known to be crystal clear. But that was decades ago. Now what remains of Bagmati is neither mighty, nor clear. Despite being revered to as a godly entity by the population of the valley, its present state is pitiful. According to many, it is even too far gone to be rejuvenated, labeling it as a problem too wicked. And this complexity makes it difficult to uproot its source. In fact, rather than a single source, there is a vicious cycle to be blamed. This is more true than ever in the neglected riverscape of Balkhu-Sanchal. A place where I grew up to see the pitiful transformation.

Over the years, the rapid urbanization of the valley has initiated a stream of isolated brown agendas that completely took over the importance of green in the valley. Balkhu-Sanchal being located at the 'edge' of the city faces the extreme repercussions from this imbalance. While there is steady growth of environmental and social awareness among people, the negative perception of the Balkhu-Sanchal riverscape has now been set into the mindsets of the population. Previously the riverscapes were seen as the backbone of the valley, a landmark in itself. But now as the city spreads, the dependance of the man to the river has gone down. Hence, its image has been reduced to the backyard of the valley, a discarded edge. Due to this, despite having the awareness for need for change, it is still challenging to revive the memories.

Hence the first step to change is rejuvenating the 'image' associated with the river itself, which consequently plays a huge role in forming the 'environmental psychology' of the stakeholders. And this is only possible if we approach it through an attempt to merge and evolve the green and brown agendas, instead of getting stuck in their dichotomy. The challenge ahead is to build localized UEP based strategies that are impactful and achievable in the small yet meaningful riverscape of Balkhu-Sanchal

Foreword

The Bagmati river is undeniable an important entity for all of the Kathmandu valley. This makes the topic of its revival one of extreme popularity, history as well as conflicts. But nonetheless one that has unlimited scope of study. Having grown up in the vicinity of the once glorious Balkhu-Sanchal (Bagmati) riverscape, the author was drawn towards investigating deeper into the subject. Thus, this research was formulated, to view the riverscape through the looking glass of ‘image’ and ‘perception’. A strong feature of the study is based around the ever-growing debate around green and brown developmental agendas.

Acknowledgement

This thesis is part of the MSc. in Urban Ecological Planning program at Norwegian Univeristy of Science and Technology (NTNU), Trodheim, Norway.

Writing a Master thesis in the wake of an pandemic was a rare and unprecedented situation. Yet here we are at the end of it. And this would not have been possible without the help of my family, friends and colleagues back home in Nepal, who dedicated time and effort for my cause, as field assistants and interviewees. Their help made a digital field-work somehow possible, and for that I will be forever grateful.

I would like to give special thanks to my supervisor Prof. Hans Christie Bjonness, whose cheerful and motivating comments, constantly pushed me to reach the end line while giving it my best. His invaluable knowledge on the topic was extremely eye-opening to me, and gave my thesis a much needed realistic perspective.

And lastly a big thank you to all my friends within and outside of UEP, for adding many moments of light hearted fun whenever needed. Thank you all for the support through these day (and nights) of writing!

28 June 2021
Trondheim, Norway,
Alvira Shrestha

Statement of Originality

I certify and that this is my own work and that the materials have not been published before, or presented at any other module, or program. The materials contained in this thesis are my own work, not a "duplicate" from others. Where the knowledge, ideas and words of others have been drawn upon, whether published or unpublished, due acknowledgements have been given. I understand that the normal consequence of cheating in any element of an examination or assessment, if proven, is that the thesis may be assessed as failed.

28 June 2021

Trondheim, Norway

Alvira Shrestha

Table of Contents

List of Figures

List of Table

Abbreviations and accronyms

ADB- Asian Development Bank

BAP- Bagmati Action Plan

BASP- High Powered Committee for Implementation & Monitoring of the Bagmati Area Sewerage Construction/Rehabilitation Project

BOD- Biological Oxygen Demand

BRBIP- Bagmati River Basin Improvement Project

BRF- Bagmati River Festival

CBS- Central Bureau of Statistics

COVID-19- Corona Virus Disease of 2019

CSR- Corporate Social Responsibility

CW- Constructed Wetland

DEWATS- Decentralized Wastewater Treatment Systems

DO- Dissolved oxygen

DUDBC- Department of Urban Development and Building Construction

GDP- Gross Domestic Product

GON- The Government of Nepal

GSTP- Guheswari Sewage Treatment Plant

HPCIDBC- High-Powered Committee for Integrated Development of Bagmati Civilization

IOE- Institute Of Engineering

IWRM- Integrated Water resource Management

KMC- Kathmandu Metropolitan City

KVDA- Kathmandu Valley Development Authority

LFA- Logical Framework Approach

LMC- Lalitpur Metropolitan City

LTG- Limits of Growth

MoUD- Ministry of Urban Development

NGO- Non Governmental Organization

NORAD- Norwegian Agency for Development Cooperation

NPC- National Planning Commission

NRCT- The Nepal River Conservation Trust

NTNC- National Trust of Nature Conservation

NWCF- Nepal Water Conservation Foundation

PM- Project Matrix

ROW- Right Of Way

RQ- Research Question

SDGs- Sustainable Development Goals

SRQ- Sub Research Question

TPO- Town Planning Office

UEM- Urban Environmental Management

UEP- Urban Ecological Planning

UN- United Nations

UNESCO- United Nations Educational, Scientific and Cultural Organization

VDC- Village Development Committee

1 Introduction

The eminence of the ancient civilizations of Egypt, Mesopotamia, and India along rivers like Nile, Euphrates-Tigris and Indus are historical testaments that settlements emerge and flourish around riverscapes (Singh and Tiwari, 2016). Not only did rivers suffice the basic human need of water, but also the need for food by providing fertile land for cultivation. Hence cities were shaped by the characteristics of the water source – defining people's dependent relation with it. As such civilizations grew and spread out, those very settlements evolved into modern day cities and mega cities.

One such urban entity is the Kathmandu valley- capital to democratic republic state of Nepal, birthed around the Bagmati river (Fig. 1-1). With the overwhelming population growth and urbanization that began in 1950's, the valley in itself has "developed" drastically through the decades (Platman, 2014). And not all of these transformations can be categorized under prosperous. Unfortunately, the state of the very cradle of the civilization- Bagmati river is one of those negatives.

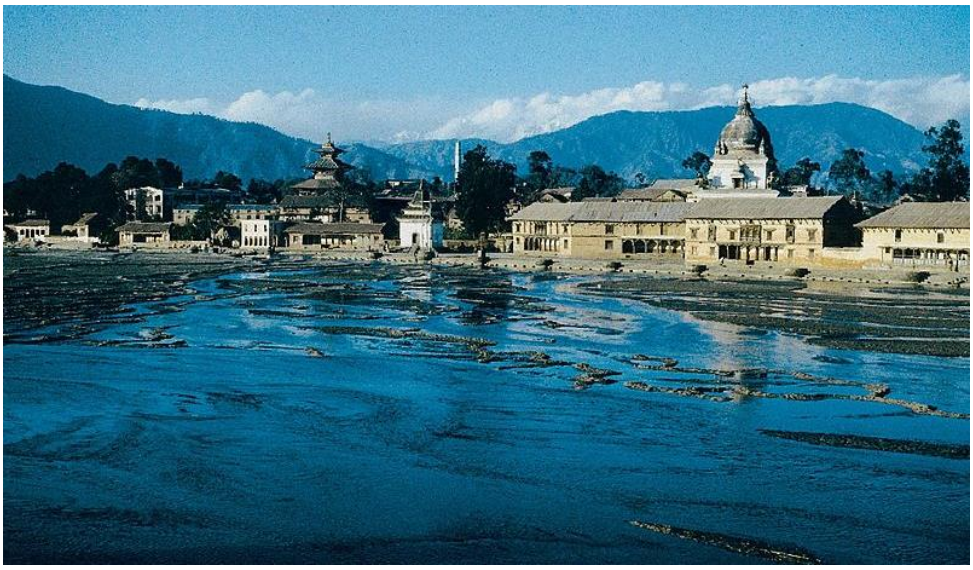


Figure. 1-1 Bagmati river, thriving in the 1950's (Wikipedia, 2021)

As mentioned above, the Bagmati river has been central to the formation of the Nepalese civilization, especially the Kathmandu valley. Its total length is 586 km with 3710 sq.km catchment basin area – out of which 15% is within Nepal and only 4.23 % is within the Kathmandu valley (NTNC, 2009). 30 km of the river runs through the valley separating Kathmandu Metropolitan City (KMC) from Lalitpur Metropolitan City (LMC). Its journey begins as the tributaries of Mahabharat and Chure Ranges, sprouts from some 15 km Northeast of Kathmandu at the 2690m high Bagdwar in the Shivpuri-Nagarjuna hills, and then finally drains out of the valley at 1140 m high Katuwal daha. As it flows into Nepal′s terai region, it slowly becomes one with the Indian Gangetic plain. It is annually fed by rainfall and natural springs. The Bagmati river′s major tributaries within the valley are as follows – Dhobikhola, Manohara, Tukucha, Bishnumati, Balkhu, Nakhu, Kodku and Godwari (NTNC, 2009).

Nepal was a Hindu country up until 2015. And even as a secular state, it has a majority of Hinduism follower. As per Hindu culture, rivers are considered a representation of goddess "Ganga". Thus, Hindu's regard river water as a holy entity that can purify one's soul. This has led to many religious sites and temples being built in riverbanks. The same goes for the Bagmati river, which has many holy temples like the highly regarded Pasupathi Nath Temple built next to it. While the river water gives life to the living, it is also believed to provide salvation to the deceased – which is why the last rites are performed on the riverbanks and the ashes are flown into the river (Shakya, 2011).

But despite the river being revered to as an image of God, it has seen decades of heinous degradation. If traced back to its origin at the Shivpuri-Nagarjuna Hills, people would be surprised to see crystal-clean water. But unfortunately, the closer it travels to the heart of the valley, the filthier it becomes. With sewage and wastewater being disposed into the water, the 'worshipper' seems to have sidelined the 'worshipped'- for years now.

1.1 Scope of the study

The Bagmati river is a large entity that runs for 597 kms. Hence, studying it in its entirety is not feasible for this study. Instead, I would be focusing on a smaller section which best fits the scope of this thesis work – the 'Balkhu-Sanchal riverscape' (marked by the red circle on Fig. 1-2), which lies between the Bishnumati-Bagmati and Balkhu-Bagmati confluences. This section is located on the junction of Kathmandu and Lalitpur districts of the Kathmandu Valley. The motivation behind this selection is discussed further in Chapter no. 3.

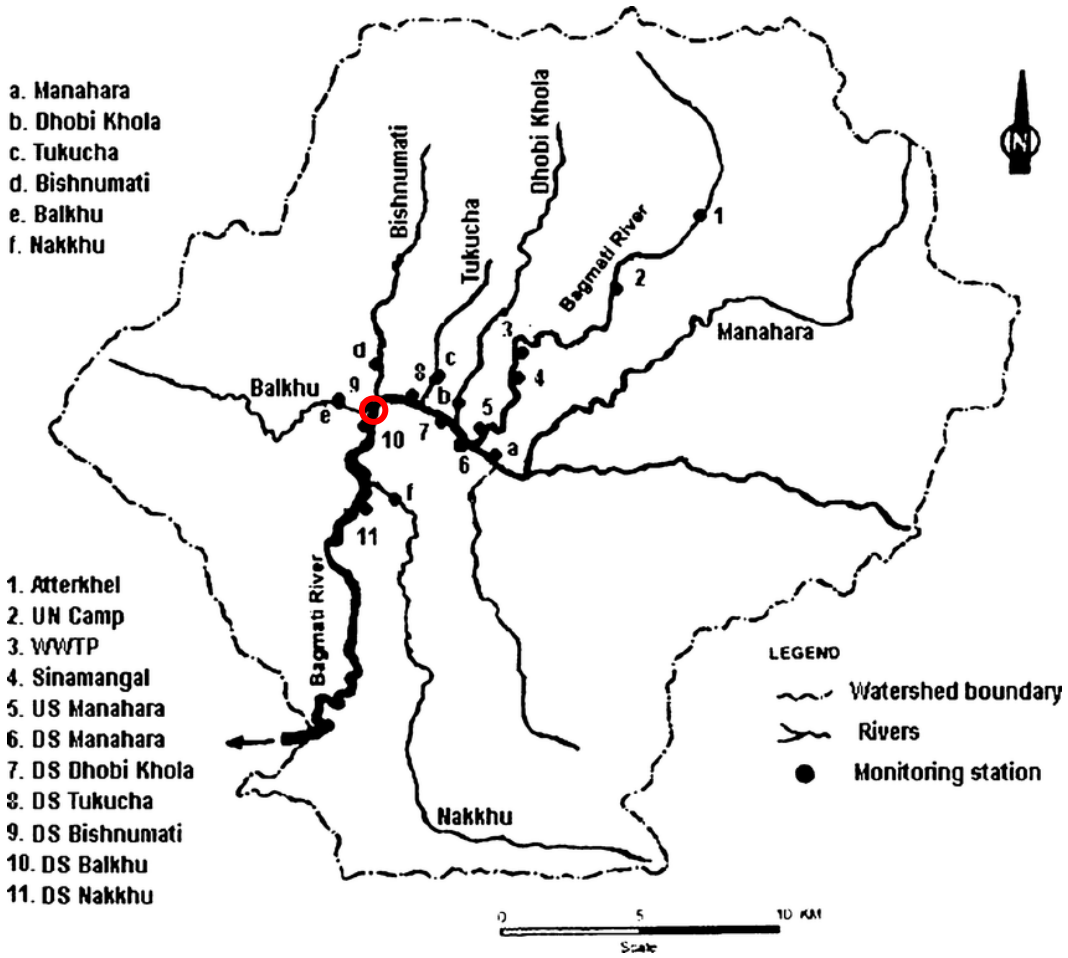


Figure. 1-2 Bagmati river network and its tributaries (Kanel, 2007), adapted by author to mark case study area by red circle.

1.2 Need for the study

The present was obviously not always Bagmati's reality. It was the year 1982. My parents and grandmother had just moved into their newly built house- one of very few scattered in the Sanchal locality next to the Balkhu-Sanchal section of Bagmati river. The rampant urban expansion had not taken over the riverscape yet, and hence they enjoyed a peaceful view of the glorious river with the hills in the background. Even though I grew up in that very house, that is sadly not the view I remember. In fact, the view kept changing for the worse with each passing year. As I grew up and became more aware about my surroundings, it was interesting to realize how Bagmati was actually once the cultural 'back-bone' of the city, when now it is treated more like the 'back-yard' and dumping ground of the city. But the memories continue to remind people of what used to be.

1.2.1 The haphazard and inevitable urbanization of the Kathmandu Valley

Nepal interestingly holds a position in the "top 10" list of 2 contradictory categories (Bakrania, 2015). –

- least urbanized countries in the world, yet also in
- fastest urbanizing countries – surpassing its south Asian neighbors – Sri Lanka, India, Pakistan, Bangladesh etc. (Thapa & Murayama, 2010).

This is an outcome of thousands migrating to urban areas, in hopes of a better life quality and services (Mahaseth, 2017). The districts that the Kathmandu valley encompasses, have become the most popular choices for such migrations. As per the 2011 statistics, both Kathmandu and Lalitpur cities/municipalities have seen soaring rural to urban migrations rates of 71.8% and 56.6% respectively (Shukla, 2015).

Moreover, figure no. (1-3) demonstrates how Kathmandu and Lalitpur districts have the highest population growth rates (4.78%, 3.26% respectively) whereas 25 districts have a decreasing population rate exhibiting the possible flow channel of migrations. While Kathmandu district has the highest population (Fig. 1-4) , Lalitpur district barely makes the top 10 (CBS, 2011). Despite that, Lalitpur accompanies Kathmandu in the top 3 districts with the highest population densities that easily surpasses the national density (Fig. 1-5) (CBS,2011).

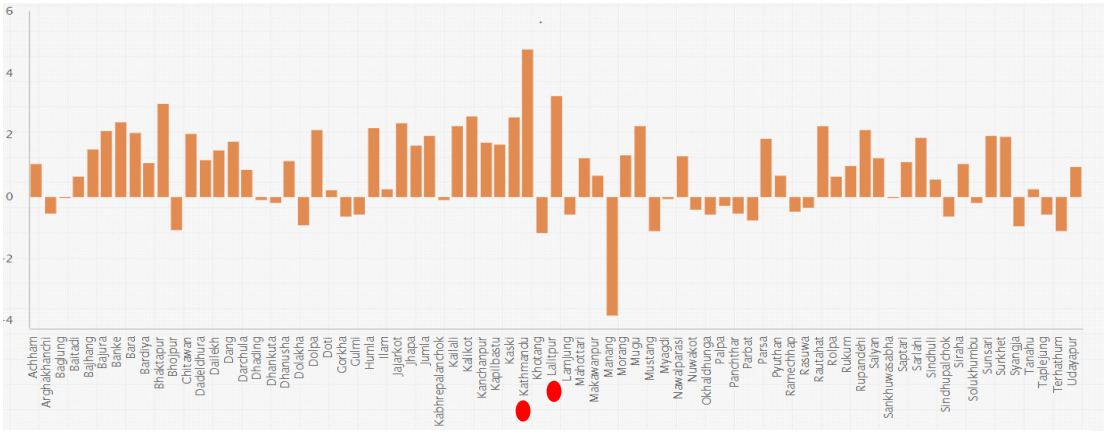


Figure. 1-3 Population growth rate of Nepalese districts (CBS, 2011), Kathmandu and Lalitpur marked by red circles (adapted by author)

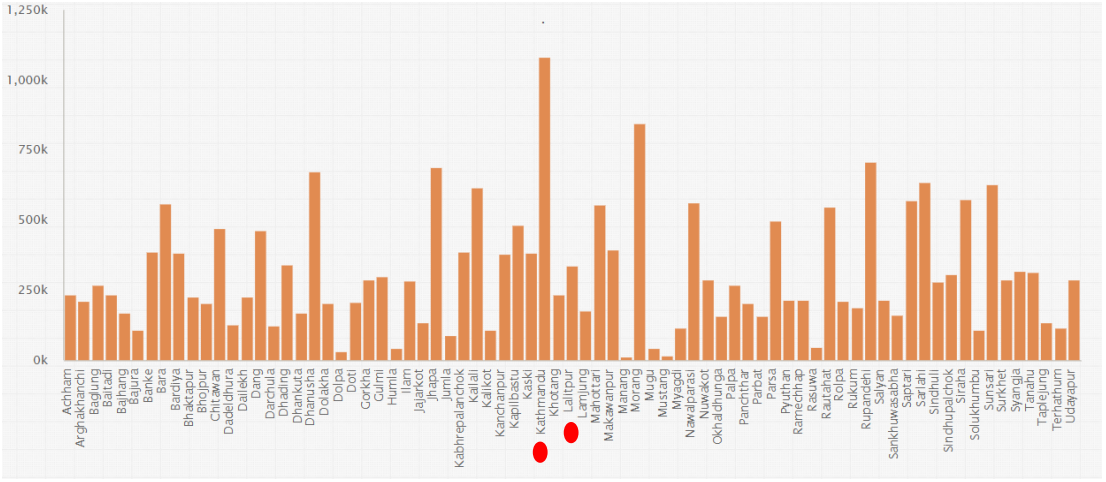


Figure. 1-4 Population of Nepalese districts (CBS, 2011), Kathmandu and Lalitpur marked by red circles (adapted by author)

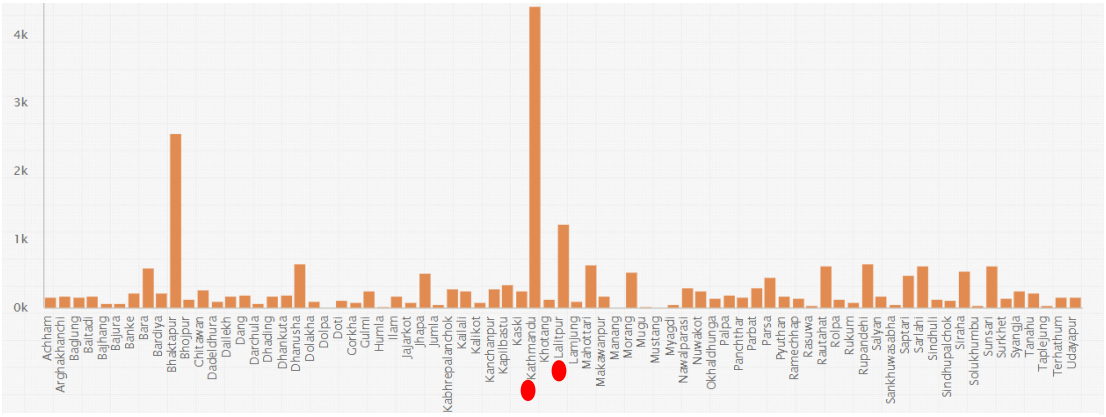


Figure. 1-5 Population density of Nepalese districts (CBS, 2011), Kathmandu and Lalitpur marked by red circles (adapted by author)

The above trends are not ceasing anytime soon. Population growth and urbanization is not under our full control and is inevitable in fact. Which means the numbers will only go higher up for both Kathmandu and Lalitpur, and thus consequentially for our case study area. The ever-multiplying need for housing, natural resources, infrastructure, utilities, and employment has crippled down urban development process to one full of haste. So instead of efficient services and solution, today's urban areas are facing issues such as environmental degradation, congestion, lack of water- supply, mismanaged waste disposal, unemployment, poverty etc. All these and more have become key words when describing any developing country's major cities, and the same goes for Kathmandu and Lalitpur. In such a state, the Bagmati river is bound to face increased degradation. While there are cities around the globe that take pride in celebrating and highlighting their riverscapes, the Bagmati riverscapes, including Balkhu-Sanchal has been minimized to service corridors- unpleasant and purely utilitarian (Fig. 1-6)!

The riverscape therefore needs an urgent image rejuvenation. For many years there have been several efforts towards it as well. But most of them have had wide imbalances between 'green' and 'brown' developmental agendas. Which is why there is a colossal

need to study how these developments have transformed the riverscape and people's image of it. Only when we understand the past, can we learn from it, and move towards achievable solutions. A better future of the Balkhu-Sanchal riverscape is only possible if we come with agendas that go beyond generalized ideas and instead dependent on localized inferences.

Figure. 1-6 Unpleasant and utilitarian state of Bagmati river (The Rising Nepal, 2020)

1.3 Framing the research questions

Having understood the need and the scope of the study, I will move on to the formulation of the research questions. My main research question (RQ) is:

How can we merge and evolve green and brown agendas to rejuvenate the imagery and the environmental and social awareness around the Balkhu-Sanchal riverscape, and build a healthy sustainable river environment ?

To aid the fulfillment of the RQ above, I would like to introduce 3 sub research questions (SRQs).

- **SRQ1-** ***What role has various green and brown agendas played in transforming the imagery of the Bagmati riverscape, and vice versa? And what problems, but also opportunities, have been created and call for attention due to this complex and wicked transformation?***

- **SRQ2-** ***Who are the stakeholders involved, and what are their priorities? Why is it important for civil society and local government to support the stakeholders' diverse interests and rights in order to truly rejuvenate the imagery and in building citizens´ collective ownership and responsibility ?***

1.4 Thesis outline

The thesis is packaged with 7 defining chapters. This first chapter has focused on introducing the need of the study leading on to the framing of the research questions. Chapter 2 will build a foundational base for the theorical concepts used for this study. Chapter 3 will allow a look into the interlinked contextual levels required for the case study. Next, Chapter 4 will guide the readers into the various designed and applied research methods and theory of methodology. Moving on, Chapter 5 will describe the case study area of 'Balkhu-Sanchal riverscape' through a chronological format, which is followed by the findings and project implications. This chapter 6 will mobilize a Logical Framework Approach to present the key findings of the study, and also recommend possible implications through a project proposal. Towards the very end, Chapter 7 will conclude the thesis with summarizing and comments.

2 Theoretical Perspective

2.1 Existing Knowledge

This chapter attempts to develop a theoretical base for the aspects that guides this research :

1. Image and the memory of it, perception and environmental pscychology
2. Green agendas vs. Brown agendas, and lastly
3. Sustainability and the UEP approach.

Discussions around aspects 1 and 2 will help us uncover answers for the first research sub question (RSQ1): *Who are the stakeholders involved, and what are their priorities? Why is it important for civil society and local government to support the stakeholders' diverse interests and rights in order to truly rejuvenate the imagery and in building citizens´ collective ownership and responsibility ?*

Similarly, aspect 3 will aid the justification for the second research sub question (RSQ2): *Who are the stakeholders involved, and what are their priorities? Why is it important for civil society and local government to support the stakeholders' diverse interests and rights in order to truly rejuvenate the imagery and in building citizens´ collective ownership and responsibility ?*

At the end of this chapter, a theoretical framework will be discussed that aims to combine the knowledge of all 3 aspects, towards approaching the main research question (RQ): *How can we merge and evolve green and brown agendas to rejuvenate the imagery and the environmental and social awareness around the Balkhu-Sanchal riverscape, and build a healthy sustainable river environment ?*

2.1.1 Image and the memory of it, Perception, and Environmental psychology

"We live in an image-filled world. And these images challenge us everywhere in museums, galleries, the internet, in the media, and in monuments too. The power of image comes from the fact that we experience and understand them from our own perspective." (Lipp, 2011, p. 25)

The omnipresence of image, as discussed above is one that cannot be ignored. But often due to its very omnipresence, the power it holds is left underappreciated. With the complexity of cities on the rise, we are presented with hundreds of imageries at every step of a day. So, what is an image really? The most basic understanding of it would be – a visual representation of an object or a person. But there also exists an answer that digs much deeper than just to what our eyes see, but instead a combination of what all of our five senses (eyes - sense of sight; ears - sense of hearing; tongue - sense of taste; skin - sense of touch; nose - sense of smell) experience and take in. What their interactions brings about - "enables the mind to better understand its surrounding" (Groeger, 2012).

One of the many ways Oxford language (2021) dictionary defines image is how an image of a person impact others- "The general impression that a person, organization, or product presents to the public".

Similarly, another definition goes further and aptly describes the commonality of an image or images as- "a mental conception held in common by members of a group and symbolic of a basic attitude and orientation" (Merriam-Webster Dictionary, 2021)

These impression/conceptions layered with our personal belief systems, socio-economic backgrounds, – knowingly or unknowingly affect the decisions we make in our day to day lives. So, in a way our surroundings, and interaction with others being aware of their perceptions of images, drive our image and perception. And that very

image/perception later drives our behavior towards our surroundings, possibly shaping it further on towards our conscious action and practices. Hence it is a cycle that can either be sustainable or toxic. To comprehend this relationship, let us dive into some earlier discussions on image, perception, and environmental psychology.

- **Evolution of the perception of the "human to environment" relationship**

Over time and history, our society has transformed by extraordinary measures. A transformation of similar caliber can be identified in the way we; humans perceive our own relationship with our surrounding environment (Lipp, 2011).

The earliest viewpoint was theocentric - keeping God in the center of focus for all matters (Oxford Languages, 2021). Since earlier societies had not advanced much in terms of innovations, they relied greatly on natural resources for their day-to-day activities. For instance, they consumed water directly from the source, grew their own crops for food, cut their own firewood for heat etc. Their close tie with nature, allowed them to harbor the deepest of respect for their environment. And hence people in many cultures even worshipped them as forms of gods. With high regards for religious and cultural beliefs, the then relation was where the natural environment was the divine almighty, and humans the devoted commoner. As duly explained in Wikipedia (2021)- "the tenets of theocentric, such as humility, respect, moderations, selflessness, and mindfulness, can lend themselves towards a form of environmentalism".

Years later, the era of industrialization took over the world. With new advancements and products at service, humans started to create new techniques to carry out activities. First it was out of need of the booming population. But soon the developments were motivated by human wants and sometime greed, which kept escalating, and not basic needs. These developments in industrial societies slowly replaced our direct reliance on our natural environment. This does not imply that natural resources were not being

utilized. In fact, just the opposite. They were being overused and exploited to the maximum to keep productions running. But the unparalleled importance of the natural resources was now overshadowed by the complexities of the industrial processing[1].

Thus, us as end users started overlooking our intact dependence on natural environment, and instead got engrossed in our ability to simply extract from nature whenever we pleased. Humans now found themselves to be the "self- confident center of the universe" (Lipp, 2011) nurturing a deeply anthropocentric ideology. Anthropocentricism is "regarding humankind as the central or most important element of existence, especially as opposed to God or animals" (Oxford Languages, 2021). And hence the "theocentric" human to environment relation took a tragic turn and into the back seat.

Anthropocentricism has been at the wheel for a long time, a period that has catapulted the society towards many positive as well as negative changes. Seeing the striking negatives, a new perception came upon us – biocentrism "the view or belief that the rights and needs of humans are not more important than those of other living things" (Oxford languages, 2021). This shifted the human species role away from the central focus and instead placed them on the periphery along with all natural creations. Hence, a fresh new philosophy on the inter-relationship of living organisms was birthed by Arne Naess in 1973- "deep ecology" (Erdős, 2019). Yes, natural resources are instrumental assets to human beings, and that makes it critical for the natural world to be respected. But that is barely the only grounds for their preservation. Naess argued that it is the moral right of each and every natural organism or element to exist and prosper. And it is not within human entitlement to hamper the complex ecosystems that they inherently owe their own survival to. While the concept of "deep ecology" is

[1] The environmental implication of the exponential economic growth was studied by a research team from Massachusetts Institute of Technology, in a 1972 report – The Limits of Growth (LTG) (Behrens, et al. 1972)

notably noble on paper, it has been widely criticized for being a “utopian” trope- too idealistic to be achieved (Wikipedia, 2021). Moreover, critics have expressed that the theory finds basis on unrealistic mysticism and fails to truly comprehend the complications and hierarchies brought on by the current global/national/local political landscape (Madsen, 2016).

Such criticisms bring forth the need to delineate the positives from the negatives in such theories. In the case of “deep ecology”, it is true that the world cannot be equalized at the whim of it- but every small step can be beneficial towards balancing out the extremes of anthropocentricism. Following this trend, some “eco-cities” have started sprouting around the globe. Eco-cities are urban forms that incorporate sustainability into their development and have low environmental ramifications (Singh, 2015).

- **The Image of the city**

In the above section, we discussed how the anthropocentric view dictated a certain phase of human society (and still continues to persist in fact). This phase led us to cities with physical environments that are a tricky overlap between natural and man-made components.

The complexity of a city relies in the fact that many socio-technical systems exist, adapt, and prosper within it. With so many things going on simultaneously, a city or even just a neighborhood, can be hard to take in all at once. Instead, our human mind filters out the perceived key ingredients to create a mental map of our surroundings. Human perception is a powerful tool and Kevin Lynch understood the value of studying it. In 1960, Lynch came up with ‘The Image of the City’ which went on to become a huge steppingstone for all planning and architecture aspirants. With the assistance of interviews and sketches by the participants, Lynch was able to accumulate an overview of the imagery people carry of their city (done for 3 American cities). These empirical

studies paved the way towards identifying the now widely known 5 basic physical elements – Paths, Edges, Districts, Nodes and Landmarks (Fig. 2-1) (Topcu and Topcu, 2012). These constituents are what forms our perceptions adding meaning to our sense of our environments through legibility and clarity of the space.

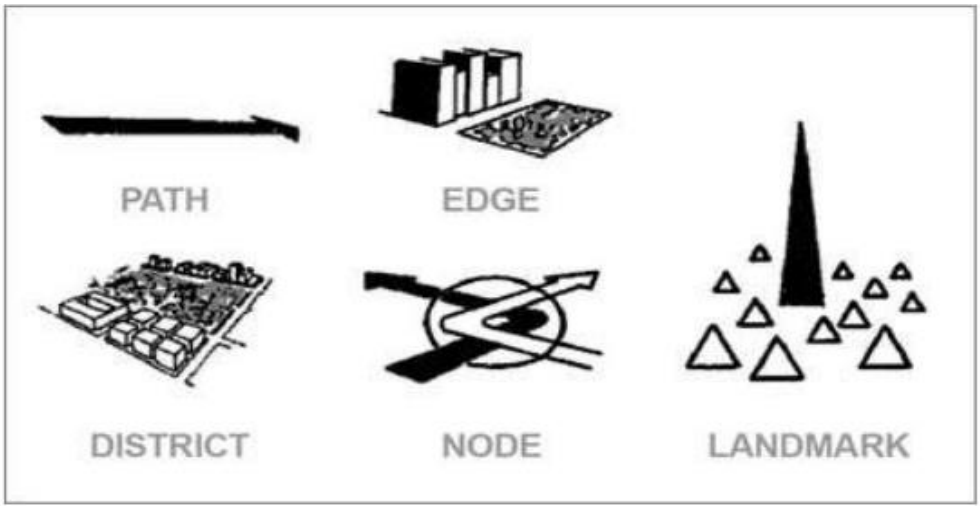


Figure. 2-1 The 5 basic physical elements of a city (Lynch, 1960)

In 1997, Lynch's work was taken further ahead by Nasar (1998) in the 'Evaluative Image of the City', with the intention of blending the factor of humans' evaluative nature into imageability. He explored the idea that since human minds are emotionally driven, their perception and actions also are a response of their feelings. Meaning people's negative or positive feelings can and should play a key role in designing our cities and spaces.

While Lynch's work has continuously been used as foundational knowledge for architecture and planning aspirants, some believe that it over-simplifies the urban environment with the use of basic labels (Gold, 2012). A similar opinion can be made about Nasar's Lynch-inspired evaluation on the basis of "likes" and "dislikes" which can come across as vague and lacking. Despite these claims, the value of such theories cannot be undermined, as they both can potentially uncover the spatial cognition embedded

within the classifications made by people (whether in terms of Paths/ Edges/ Districts/ Nodes/ Landmarks, or degrees of likeability of a place). In the 60's when urban renewal was being dominated by a top-down notion of planned order and functionality, Lynch's contribution brought the spotlight back to "human scale" and "individual experiences" (Gold, 2012). And the desirability of such bottom-up approach has only been growing ever since.

- **Environmental psychology**

In 1968, Roger Barker famously came up with the term 'environmental psychology', which revolved around the study of human – environment interactions. His goal was to highlight that understanding the physical context or the environment, can help us understand and even predict human actions (Australian Psychological Society, 2020). This field has been touched by many theorists and can be traced back to as early as the 20th century. Through this concept, we are presuming that "each place (at any scale) has a mix of values and impressions." (Eraydin, 2014). Therefore, humans feel variation of emotions associated to it, in terms of comfort, safety, satisfaction etc. Once we uncover these insights, we can gauge how our environment affects our behavior and vice versa.

A reflection of this can be seen in the concept of spatial behavior. It basically employs observation of human movement pattern, to decode their motivations for it. The movement may be as simple as the daily travel between work – home, or an infrequent visit to a public park. The behavior hence varies from one person to another, shaped by many factors such as perception, cultural values, motivations, social structure etc. Hence in 1988, Jon Lang summarized that "spatial behavior is dynamically organized around the satisfaction of human needs" (Eraydin, 2014).

Further on, by acknowledging the merit of spatial behavior study, Thaler and Sunstein introduced a new concept called ‘the nudge theory’ in 2008. They realized that the environment can be designed or altered in such a way that people can be ‘nudged’ into behaving, interacting in a certain way (Neutel, 2017). These designs or alterations are not made to mandate actions, instead influence, and steer them towards an ideal. It is safe to assume that all or most of planning/ architectural interventions are introduced with the purpose of ‘nudging’ a target population into adopting a certain behavioral culture. For example, a basic bicycle lane would be a ‘nudge’ towards environment friendly commute, whereas the absence of it would be a ‘nudge’ towards a speed-centered transit. Widely prominent in the last decade, the nudge theory is applied by all sectors. This re-branded scheme of ‘cause and effect’ can have both positive and negative implications. And if utilized responsibly, it has great scope of creating positive place relations and improvements through urban planning, upgrading and architecture.

Thus, environmental psychology and its related concepts, reveal a behavioristic approach that can be combined with the cognitive[2] learnings from tools such as ‘Image of the city’ etc.

2.1.2 Green agendas vs. Brown agendas

There exists a complex network of global agendas, established for the improvement of the urban environment. They may be categorized into 2 broad umbrellas. The first is the brown agenda, which aims to provide for human health and primary service needs. It focuses on addressing the urgent problems of lower income

[2] Cognitive: “of, relating to, being, or involving conscious intellectual activity (such as thinking, reasoning, or remembering)” (Merriam- Webster Dictionary, 2021)

groups. On the other hand, we have the green agenda, which believes that the ecosystem's health should be the top priority. This perspective asks people to take a step back and look at the long-term effects of their actions, and how it can create devastation for our future generations (McGranahan and Satterthwaite, 2000). In fact, it would not be wrong to say the devastation has already begun.

Another way of grasping these 2 categories can be Graham Haughton's environmental equity principles. In 1999, Haughton outlined 5 equity principles that can in fact be grouped under the green or brown agendas (Ali, 2015). Themes associated to brown agenda are (Gibbons, 2015):

- **Intra-generational equity:** focusing on roots of social inequality of the current generation.
- **Procedural equity**: giving platform to enable inclusivity through participatory tools.

As for green agenda, the following themes can be understood to regulate it (Gibbons, 2015):

- **Inter-generational equity**: giving a fair chance to the future generations.
- **Trans frontier equity:** broadening the scope of local policies to target both local and global environmental issues.
- **Inter species equity:** recognizing all species have the right to survive as much as humans do.

While Haughton describes his principles as interconnected (as they should be), the broader umbrellas of green and brown agendas often find themselves pitted against each other. They are often advocated in extreme isolation causing a state of dichotomy. Now both brown and green agendas are important- So how is the best approach decided and by whom? Tarafdar (2009) outline 3 paradoxes with reference to this constant tug of war:

- **Institutional Paradox** : Administratively speaking, a city has varying levels of authorities under varying departments. There are firstly high authorities that can bring monumental changes due to their large jurisdiction. But many times, their expertise is not maximized on as they are not acquainted with true local issues. Instead, they are limited to a top-down approach that hardly reaches the crux of the matter. On the other hand, the lower-level authorities have better understanding and reach in the context. Yet many times they might be overridden by higher level decisions. Hence the chosen approach becomes a matter of 'who takes care?' and what do these caretakers care about?

- **'Single Agenda' Paradox**: Tarafdar explains how typically the blame for environmental degradation is attributed to the urban poor. Whereas higher percentage of consumption, and hence waste and pollutant generation can actually be linked to higher income groups (McGranahan and Satterthwaite, 2000). This makes us question our understanding, and ask ourselves what issues deserves the most attention? But many times, priorities are misplaced sending true 'green' or even 'brown' agendas to the backseat.

- **Paradigmatic Paradox**: The global South and the global North are distinctively different due to their varying lifestyle culture, ideologies, and environments. Their difference should be acknowledged and respected at all times, including while implementing developmental projects. But unfortunately, most agendas end up being centered towards the global North based technologies that have no guarantee of being successful in the vastly different global South contexts. Hence a deeper and localized look into the 'how' part is required. If not, efforts will remain ineffective and wasteful-whether green or brown.

No doubt the paradoxes increase the complexities of the issue. And that is exactly why collaboration of the various sides or agendas should be pursued, and not their

rivalry. Both agendas are elements that make up a single continuum. Impact on one end can result in consequences in the other, as described in the economics of climate change (Tol, 2006). Hence, isolated, and sectorial problem thinking – in a complex system such as a city can act counterproductively, which is not desired.

2.1.3 Sustainability and its link to Urban Ecological Planning (UEP)

Sustainability and sustainable development have become trendy keywords that are thrown around in every discussion nowadays. While the hype around the practice is a good sign, it is also vital to accept that it is often used carelessly.

A truly sustainable approach to development "meets the needs of the present without compromising the ability of future generations to meet their own needs" (Kono, 2014). This extensive and foundational definition came into being in 1987, after a 1972 UN conference on human development set a new paradigm. It marked the very beginning of international discussions about sustainability (Singh and Tiwari, 2016).

To help assess the degree of the much debated 'sustainability' of any development, Bjønness (2008) presented a ´check list of Human Settlements and Right Concerns´. This had been further refined from the United Nations (1995) 'Draft Statement of Principles and Global Plan of Action'. The issues put forward were as follows (Bjønness, 2008):

prime equity, social and spatial inclusion concerns.

a. efforts towards environmental protection and sustainability.
b. focus on civic engagement through democracy and local governance.

The list was inclusive of 2 more valuable points added by the European Commission (2003):

c. emphasis on skills development and work for all.

d. recognizing local/global relationships and conflicts.

Later on, in relation to contextual and territorial relations of development and conservation efforts, the following dimensions were added (Thakur and Bjønness, 2001; Bjønness, 2008):

e. cultural heritage continuity. Quality of the built environment.

But as Ehrenfeld pointed out in 1994, one of the biggest hurdles in fulfilling the above criteria is the wrongful human-centered implementation (Bjønness, 2008). Whereas in reality the interdependences of ecosystems cannot go unacknowledged in the pursuit of sustainability (Bjonness, Corneil, 1998).

What makes the pursuit even more inefficient is the misplaced focus on the global north context, when creating the plans and goals. The globalization of market has caused an extensive exchange of ideas and cultures between regions. While it has contributed to obvious economic strengthening in the global south, it has also trapped the region in a competitive environment that does not cater to their local economies leaving governments "increasingly unable to regulate national economies" (Bjonness, Corneil, 1998). This blatant prominence of westernization has led the region to make uninformed and "cookie-cutter" decisions. The cost of that is the escalating gap between the rich and poor, among citizens as well as among nations.

- **The Urban Ecological Planning (UEP) approach**

The very etymology of the word "sustainable" refers to something that is able to be sustained or continued. If a plan/goal does not have locally available knowledge or resources to build on, how can it be expected to sustain? Without local guidance, any approach is being set up for failure from the very beginning. Hence another notable point was added to the sustainability checklist – need for cultural and contextual

continuity, with respect to diversity. Local development needs to be controlled effectively, and this can only be done by "building local capacities to take immediate actions and solve local problems" (Bjonness, Corneil, 1998).

This realization has had obvious influences on the urban planning practice – giving rise to a new principle - the Urban Ecological Planning (UEP) approach. The UEP approach is much needed as it establishes that an urban ecology does not simply constitute of people and the physical environment but is in fact an intrinsic fabric made of layers of social, cultural, economic, and political attributes. Significant studies on European cities showcased that a city in itself is complicated ecosystem, and its mechanism relies upon the different components interacting with each other (Bjonness, Corneil, 1998). In the modern times, the components keep increasing. So, it is needless to state that the challenge to assess the ecosystem is on a steady rise.

To face this challenge, the UEP approach comes equipped with the understanding that degradation of one component drastically impacts the other as well – putting spotlight on the need for a multidisciplinary thinking. If the carrying capacity of a society is brought down by socio-economic stresses such as poverty, it will directly or indirectly hamper our natural environment as well. As rightly claimed in the first United Nations conference in 1972 on the Human Environment, majority of environmental problems faced by developing nations are in fact the result of underdevelopment (Bjonness, Corneil, 1998). Here it is important to clarify that development refers to social, cultural, economic, and political development altogether, and not just one of the aspects in the absence of others. Therefore, making the in-depth understanding of each aspect and its ecology monumental to the overall scheme of UEP. For instance, UEP approach is difficult to apply without the aid of 'political ecology' – which considers "the power relations that intersect and affect access to natural resources" (Benjaminsen and Svarstad, 2019, pp. 392). The political ecology- an outcome of the present landscape of aspects like social/cultural/economic- helps

shape the same aspects for the future, and as a whole they shape the surrounding environment (Singh and Tiwari, 2016). This can be said about any of the aspects, as they are elements of an interconnected web.

This interplay can either be seen as a simple reality or a complex challenge at hand. And UEP deals with this through mobilization of various bottom-up techniques. It has already been highlighted that UEP anchors on local strengths and weaknesses. And the best way to divulge them would be through involvement of local stakeholders in the decision making processes. Case in point, participatory planning methods lie at the heart of UEP, as it allows concerned stakeholders to be "enabled" rather than just "provided" for (action). This is also an integral characteristic of the "action planning" method which strongly implements non-generic and targeted measures. Some more of its characteristics are (Hamdi and Reinhard, 1997):

- Based on attainable steps
- Promoting collaborative participation of stakeholders
- Problem-based, opportunity-driven
- Utilization of local/traditional insight and skills, community-based
- Fast and efficient, not hasty
- Incremental and tangible results

Attributes like the above is what makes UEP different than UEM- Urban Environmental Management, which are commonly mistaken as the same. While they are both based on positive changes, their key established differences are as follows (Bjonness, Corneil, 1998):

	Urban Ecological Planning (UEP)	Urban Environmental Management (UEM)
1.	Addresses all environmental, social, and economic tasks in one locality.	Aims at carrying out one environmental improvement task in all localities.
2.	The specific locality is at the center of attention	The specific environmental problem is the center of attention.
3.	UEP proposals are unique for each specific place.	UEM tools are general and shall in principle, be used everywhere.
4.	Places specific, creative solutions in accordance with people's priorities and decisions.	Universal, rational solutions on technical questions decided mainly by technicians.
5.	Local resources and environmental traditions are of importance (culture-oriented).	Scientific documentation and international rules and standards have main importance (science model).
6.	Starts with local, ends with global.	Starts with global, ends with local.

Table. 2-1 Principle difference between UEP and UEM (Bjonness, Corneil, 1998)

Hence overall, the Urban ecological value system encourages a framework that promotes positive change instead of blindly following the western idea of development. Positive change is conditional on efforts towards structural change in societies taking minority civil rights in multicultural urban contexts seriously. Aided by systematical, procedural, and unique transformative actions, UEP strongly pushes for a balanced movement that can get tangible outcomes. It may start in a small scale locally, but the end goal is to build urban level equity, trust, and self-reliance.

- **The United Nations 2030 Agenda for Sustainable Development**

In 2015, the United Nations formulated a common vision for all of its Member States- The 2030 Agenda for Sustainable Development. This was in response to the 2012 UN conference on Sustainable Development in Rio (Singh and Tiwari, 2016). The result was a comprehensive action plan that urged all nations to join a united front

for the sake of "people, planet and prosperity, now and into the future" (United Nations, 2021). The statement made clearly exhibits the ambition of merging 'green' (focus on 'now' as well as 'people') and 'brown' (inclusion of 'future' and 'planet') agendas. This wholistic approach presented the world with 17 Sustainable Development Goals (SDGs) (Fig. 2-2) and 169 targets.

Figure 2-2 The 17 SDGs created by the United Nations (UN, 2021)

Traces of 'biocentrism' can also be observed above (Fig. 2-2), as the thematic areas range from human-oriented goals such as – 'SDG 1- No poverty', 'SDG 9- Innovation and Infrastructure' to nature-oriented goals such as- 'SDG 13- Climate action', 'SDG 14- life below water' etc. While a basic distinction can be made between the themes, it is crucial to note that they all have equal priority under the 2030 Agenda, as in actuality they go "hand-in-hand" (United Nation, 2021). Overall, the SDG's emphasized that transformation is only possible with the collaboration of the 3 pillars of sustainable development (Fig. 2-3): the economic, social, and environmental (McNeil, 2021).

Figure 2-3 The 3 pillars of sustainable development (United Nations System Staff College, 2021)

2.2 Theoretical Framework

Earlier in this chapter, discussions were made revolving around both global theoretical frameworks and local and individual perceptions and understandings of the quality of environment. But in this section, I will define a theoretical framework to supplement the research specifically for this thesis. Figure (2-4) demonstrates a conceptual model based on the relationship established between the 3 theoretical concepts discussed in the chapter previously. Since this thesis revolves largely around

transformation of the Balkhu-Sanchal riverscape, we shall look at everything through the glass of historic timeline- from past to present to a hopeful future.

There is notable linkage between the first 2 theories introduced – Image and the memory of it, perception and environmental pscychology: and ‘green’ agendas vs. ‘brown’ agendas. The framework is thus designed as a way of revealing this interdependent association. The perception of ‘human to environment’ changes the ‘environmental psychology’ of people towards the riverscapes. This psychology goes on to impact the essence of the then proposed developmental agendas- green, brown or a mix. The appropriate or wrongful implementation of these agendas then change the ‘image’ of a place. Hence a cycle of transformations is generated, and the understanidng and undressing of this would aid in our endeavor to answer our sub research questions.

Next our third theme- ‘Sustainability and its links to Urban Ecological Planning (UEP)’ will be mobilised to investigate the existing stakeholders- and their interests/concerns. This is undoubtedly pivotal as the stakeholders are the drivers of change, and as a UEP based project, this thesis desires to be inclusive of varying voices. Doing so will address (to the best of its capacity) the ‘who takes care ?’ and ‘what to take care of ?’ questions as presented by Tarafdar (2009). Similarly, his last paradox on ‘how to take care?’ will be conveyed via a proposal which discusses locally relevant suggestions for the future development of an urban yet vastly underdeveloped Balkhu-Sanchal riverscape.

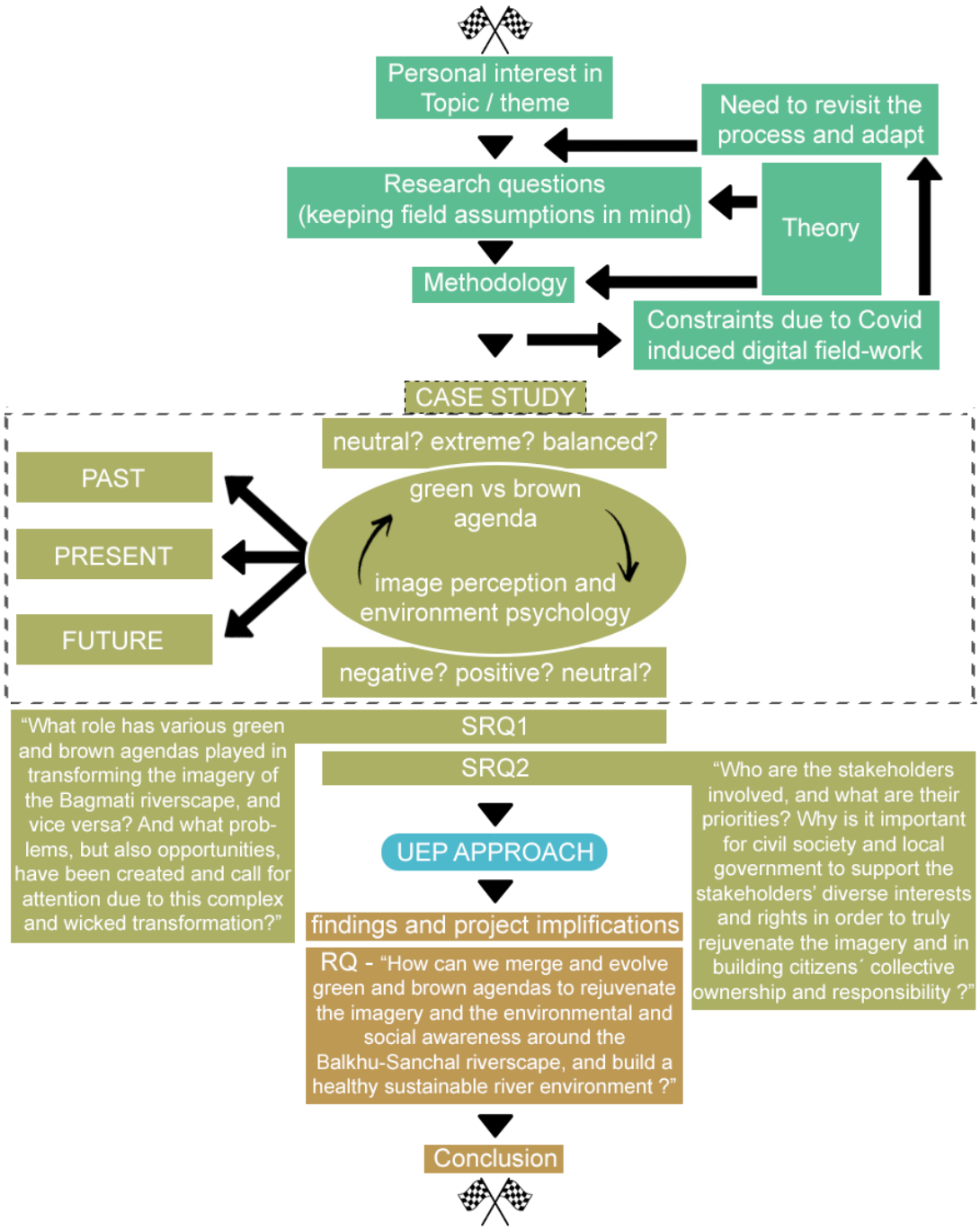


Figure. 2-4 Theoretical framework (produced by author)

2.3 Theory revisited

All three theories incorporated in this thesis presented opportunities as well as challenges throughout the process of it. As I revisited the theoretical perspectives, it was explicit that the initial linkages made between them while mostly true, required more refinement, as the issues were not as straightforward. The nature of the predicament resembled a labyrinth, where each information made me acknowledge the presence of more intricate relationship between the first 2 theories. Both of them were based on some form of categorizations. The first asked to categorize the mental as well as physical 'image and perception' of our cities/ surrounding environments, and soon through the study it was clear that the categories at many instances either overlapped (as in case of 'Image of city') or were too subjective and superficial (as in the case of 'Evaluative image of city'). Hence particular care was given as to use them conservatively and only where needed. Similar care and clarity were needed while assessing the green and brown agendas as it was crucial to recognize the embedded paradoxes, as presented by Tarafdar (2009).

Progressing through the employment of the last theory based on the UEP approach, it was essential to understand its core values. It can be a common mistake to propose idealistic utopian concepts in the name of the 'positive change'. But scale and practicality are elemental to UEP. Moreover, the positive impact on the 'environmental psychology' and 'spatial behavior' generated from the UEP proposal can only be assumed and hoped for. Nonetheless, all 3 theories have supplemented in enriching the learning through the thesis.

3 Methods

The next steppingstone in our attempt to address the research inquiry, is the methods chapter. This includes the body of applied methods used incorporated supplemented by the theory of the methodology. The research design takes the form of a qualitative case study, so as to reach into the complexities and wickedness of the problem area in question. As a mix of primary and secondary applied methods and means, information and data are gathered through literature reviews, visual time-series, video observation and semi- structured interviews. These all pave the way for the researcher to come to an analysis despite various challenging limitation, all which will be explained within this chapter.

3.1 Methods vs. Methodology

Before diving further into this chapter, I will take a moment to differentiate between the body of methods, and the theory of methodology as mentioned above. While they cannot be thought about separately, they should not be considered one and the same either. A method is "a particular procedure for accomplishing or approaching something, especially a systematic or established one" (Oxford Languages, 2021). So here, we are looking to accomplish and approach the answers to our research questions, and the means to do that is through our body of methods. Hence, while methods are mere instruments to collect the information, the theory of methodology is the thought process designed to carry out the research (Igwenagu, 2016).

One great quality of a research is when it can capture a reader's interest and allow them to continue it by retracing the research design. This can only be possible if the theory of methodology is incorporated well enough to provide the rationales behind the very framework (Rangahau, 2020). Moreover, it can push the researcher towards a

disciplined and critical decision-making attitude, which only strengthens the overall study (Igwenagu, 2016).

3.2 The complex problem at hand: through the lens of Wickedness

How straight forward can problem-solving be? Is it just defining a problem, and implementing a solution to it? Some problems are undoubtedly a much larger and complex challenge, and those problems are now popularly known as ‘wicked problems. Coined by design theorists Horst Rittel and Melvin Webber in 1973, this concept sheds light to the complex nature of social planning themes. Rittel and Webber explain that matters of technical science or mathematics have a clear path and solution, making their problems complex yet ‘tame’. But when it comes to planning problems, the social construct in reality adds layers of uncertainty and risks (Stony Brook University, 2021). This lack of delineation of a known solution also impediments the anticipation of a fixed time period. The complexity of each aspect intertwines to the level that, it becomes ‘wicked’- something people rather avoid than deal through. To form a good appreciation of the wickedness of a problem, we can summarize its characteristics as outlined by Rittel in 1973 (Quay, 2020):

- Problem cannot follow well-defined path of problem solving, so does not have a clear solution either.
- There is no complete true or false solution, as everything is subjective due to the socio-political nature of it.
- They have multiple causes, and themselves are one of multiple causes to other problems.
- Their character is unique; hence solutions or processes cannot be generalized.

All these features hint that the case of Bagmati river is seen by the concerned citizens as a wicked problem. It is important to acknowledge that the categorization in itself has some pessimism associated to it, where the concept may be used as an excuse to not do the necessary. But this awareness can aid us to move forward and solve the 'unsolvable', or at least some components of it.

For our specific case, we have applied the theoretical foundations of 3 theories – image and the memory of it, perception, and environmental psychology; green agendas vs. brown agendas; and sustainability and its link to Urban Ecological Planning (UEP). Each act as a building block towards understanding, undressing, and tackling the wicked problem at hand – image rejuvenation[3] of Balkhu-Sanchal riverscape. And hence moving forward, the choice of the methods was made in expectation of addressing the problem with relation to the surrounding theories.

3.3 The research design: Qualitative case study

Qualitative research through a case study approach is widely popular and relevant in bringing forward contexts of complex realities. Qualitative research allows the researcher to gain a comprehensive knowledge base on a particular subject, while inductively developing more themes around it (Schuemann, 2014). It is "a strategy for doing research which involves an empirical investigation phenomenon within its real-life context using multiple sources of evidence" (Robson, 2002, pp. 173). Moreover, the inquiry allows the creation of a holistic picture of the social or human issue at hand (Creswell, 1998).

[3] Rejuvenation: "The action of restoring a river or stream to a condition characteristic of a younger landscape." (Lexico, 2021)

As for a case study, it can be understood as a method under the umbrella of the qualitative study approach itself. It is the "intensive analysis of an individual unit stressing developmental factors in relation to environment" (Merriam-Webster dictionary, 2021). This is an important definition as it establishes the requirement of a unit of analysis, which is in fact the "what" in our study (Igwenagu, 2016) – the Balkhu-Sanchal riverscape. This identification of the unit allows us to not only demarcate the boundaries of our case, but also determine and commit to the context (Flyvbjerg, 2011).

Moreover, when the definition stresses on the "factors in relation to environment", it acknowledges that the researcher themselves do not have full control over the events in the case area. Which is why the study is dependent on methods that allow intrinsic investigation of the environment, that time and again needs to be adapted to the field conditions. The same applies for our chosen problem area, making it suitable for a case study. Since this approach involves studying subjects (people, place, institutions) in their real-world scenarios, it is a great challenge to be not in command of the situation. But at the same time, it grants a realistic understanding of the situation, unlike a laboratory-like induced environment (Yin, 1994). This somewhere helps tackle the criticism by Jared Diamond, who in 1996 promoted that case studies have low scientific value as they are bound to follow the researcher's biases (Flyvbjerg, 2011). Though we cannot disregard this opinion that bias exists because it definitely does. Preconceived notions are a default in human nature, and it drives us towards certain affirmations (Bacon, 1853). This could steer many case studies into what Nassim Nicholas Taleb in 2010 termed the 'narrative fallacy' – the human nature to oversimplify information due to inclination towards qualitative narratives over hard data (Flyvbjerg, 2011). But to our advantage, image and perception of citizens is already a major theme of our entire research, which are huge contributors to biases in general. Meaning the usual criticism that case studies receive of being biased and not representative can in fact be reversed to strengthen our inventive methods towards uncovering discoveries.

3.3.1 Selection of case study area

The importance of the Bagmati river, and the need for its study for rejuvenation has already been established. While this study attempts to bring forth issues and developments of the entire river in general, it also attempts to build a more narrowed down case study of a smaller section of the river wherever possible. Without introducing this focus, the research is unable to reach beyond just the surface of the concepts (Igwenagu, 2016).

The chosen section is the riverscape close to the Balkhu bridge connecting Balkhu tole of Kathmandu Metropolitan City (KMC, ward no. 14, left of map) and Sanchal tole of Lalitpur Metropolitan city (LMC, ward no. 2, right of map). For more simplification, the site is specifically marked as the riverscape between the confluence of Bishnumati river and Balkhu river (case area marked by orange rectangle, confluences marked by red circles (Fig. 3-1). The section will be referred to as the

Figure. 3-1 Chosen case study area of Balkhu-Sanchal riverscape (adapted by author from Google Earth, 2021)

Balkhu-Sanchal riverscape for the purpose of clarity. It will be discussed further in detail in Chapter no. 5 – the case study.

Having lived within the given case area as a child, I had an extremely strong motivation towards studying it. Due to an obvious personal connection, the site and some of the stakeholders were more readily accessible for me (despite the field work being digital) and for my family (fortunately physically as well in this case). This allowed the study process to be slightly smoother, while the other limitations and challenges of not allowing on site studies remained.

Numerous studies and projects have been done around the Bagmati, yet barely any have chosen the Balkhu-Sanchal riverscape as a focus. Most of the attention is grabbed by sites with the highest cultural and religious significance. While this inclination is understandable, the neglect towards seemingly less significant sites like Balkhu-Sanchal are problematic. This gave way to a conscious decision to shine light of citizens and my local insight on it through this case study.

Now that we have established our case study area, the objective of the methods here on will be data collection that will help "determine the effect of changes in the independent variables on the dependent variable" (Igwenagu, 2016, pp. 7). While the individual unit – the riverscape can be seen as the dependent, contextual variable, the themes of our overall study – image and the memory of it, perception, and environmental psychology; green agendas vs. brown agendas; sustainability, and its link to UEP– are the theoretical independent variables. In this case I will go slightly off the statement presented by Igwenagu, as it might be more apt to call the theoretical variables 'interdependent' rather than 'independent'.

3.3.2 Data collection methods

- **Secondary data collection methods:**

This section will discuss the methods that will incorporated to access information that has already gathered by someone else for a purpose other than the research itself (Bell and Jayne, 2009).

a. Literature review:

Literature review is the use of existing scholarly resources such as journals, thesis, newspaper articles, proposal, reports etc., to get an in-depth overview on a particular subject (McCombes, 2019). This secondary method allows the researcher to create a sturdy foundation to develop their study, and also identify gaps that need to be addressed. It is a form of expository research, as it forms a basis purely through existing knowledge (Igwenagu, 2016).

The first phase of this research was undertaken through thorough literature reviews. Since the Bagmati river is a crucial component of the valley, it has been discussed widely throughout the years. This gave the researcher access a huge digital database of information mediums. While this can be a boon due to the ample number of resources, it also time and again switched roles by adding challenges to the review process. The amount of opinions, investigations, projects around the Bagmati river is one of overwhelming nature. In this situation, it was crucial for the researcher to be as systematic with the searches as possible, seeking to filter out the irrelevant from the relevant. It also became key to assess each source, as it is easy to get carried away by the information presented forgetting that each document was produced for a certain purpose or audience (Yin, 1994). As mentioned earlier biases are everywhere. While

we cannot remove biases completely, we can instead acknowledge it to understand the deeper meaning.

b. Visual time series:

The next secondary method used for data collection is a technique called the time-series, which demands a tracing of transformations of a subject over time. By piecing together information in a chronological order, I aimed to generate a "basic sequence of cause and its effect" (Yin, 1994, pp. 124). A special emphasis was put on collecting visuals to create this time series, as visuals are a great way of presenting and capturing imagery. This was aimed to enrich the overall understanding of researcher and reader, as well as create space for elicitation through comments from the interviewees (Bignante, 2010) – who are discussed in the latter part of this chapter. The following types of visuals were sought after:

- **Online photographs:** This includes the vast number of digital records that have photographically documented the Bagmati river over the years. All sources used for the literature review were revisited to gather dated images. It was critical to sieve out extremely generic images, and only retain ones that could be associated to certain locations relevant for the study. Certain active social media groups/pages dedicated to discussions surrounding the river were also tracked down, so as to collect photographs publicly posted by the group members.
- **Personal photographs:** The researcher's past residence in the area came to use here, as personal old as well as current photographs of the riverside were able to be observed. Furthermore, personal, and professional contacts added value by contributing more images from their own personal collections.

- **Digital base map and cadastral maps**: Official map data is also helpful, as they accurately display the elements of a given site. Professional contacts were mobilized to get access to digital land use and cadastral maps. But it was important to realize that these maps while accurate in showing the physical environment, lack the richness that on-ground photographs can provide.

- **Google Earth satellite images:** Google Earth is a user-friendly software that allows a person to not only view the latest maps of a site, but also lets us walk down the memory lane by switching the year. This aided the researcher compensate for what lacked in the digital cadastral and base maps.

- **Primary data collection methods:**

This section will discuss the methods used to collect primary data – data collected specially for the purpose of the research, hence for the first time.

a. Video observation:

Pictures are famously thought to be worth 1000 words. Then a video is probably worth even more. There is no doubt that a video can capture the true essence and reality of the physical setting with much ease. While it would have been an added advantage to be able to observe the site physically myself, it was not possible due to certain limitations. Hence I resorted to utilizing the technological support of video capturing for key observations. For this task, a family member was brought in as a field assistant to physically visit the site for the said videos. This was designed to be a non-participant observation, meaning the recorder (field assistant in this case) did not directly interact with the study site (Lewis-Beck et al., 2004) and only played the role of an observer/video recorder. It was also quite vital to explain the field assistant their role, because in such real-life observations, the observer should accept that their ways and

access will be constrained by various disturbances and that is part of what they have to capture (Yin, 1994).

The videos were taken between April 2021 to mid- May 2021, and instructions for the recordings were relayed to the field assistant digitally in the first week of April 2021. The instructions were carefully laid out so that all videos have a common basis of comparison. Overall, 5 sets of videos were recorded – each on a different week, on different days of the week (Monday, Wednesday, Thursday, Friday, Sunday) and a different time period (10-12pm/ 12-2pm/2-4pm/4-6pm/6-8pm). This range in time, day and week was maintained in order to capture as much variety in activities in the site as possible. Each video was taken from the same start and end points and recorded through a slowly moving car from stretch A to B, and again from B to A (Fig. 3-2) so as to cover both the sides of the riverscape.

Figure. 3-2 The path set for video recording to be used for observation (adapted by author from Google Earth, 2021)

While the natural and real-time setting was captured in a descriptive manner, the nonverbal interactions of people were not recorded due to ethical reasons protecting their privacy. Nevertheless, the visual observations were passed down through audio calls after each of the site visit and transformed into field notes.

b. Semi structured interviews:

While scholarly facts and physical observations are vital, it is also important to emphasize on individual experiences. It is even more so essential in this study, as it has a close relation to people's perceptions which are a function of their experiences, knowledge, and cultural attitudes. Hence, selecting a social constructive approach, the researcher chose to perform semi-structure interviews to give individuals a platform to develop subjective meanings that are free to differ from one person to another (Creswell, 1998).

Semi - structured interviews are a relevant method used for qualitative studies bringing forward citizens and/ or target groups views. The interviews can be understood as guided conversations, where the interviewer articulates a themed framework to maintain the flow of the talk (Yin, 1994). The semi- structured nature allows both the interviewer and interviewee to feel more comfortable and hence more likely to elaborate on open ended questions. This can greatly enhance the data collection, though it also becomes more susceptible to few inaccuracies and biases. But once again, since the theme of the research is so closely bound to image and perception, and place specific and rights based urban upgrading, the bias is also something to be remarked on.

- **Sampling of the interviewees:** As per Oxford learner's dictionary (2021), a sample is "a number of people or things taken from a larger group and used in tests to provide information about the group". Here the "test" in question is the

interviews. Let us first define what I have arrived at as the concerned population or "key stakeholders":

- Bagmati-Balkhu riverscape and area residents
- Bagmati-Balkhu squatter settlement residents
- Activists and NGO workers
- Governmental organizations representatives

The above list is a very concise and generic one, with many overlaps between them. But they represent the stakeholders with the greatest activity around the Bagmati riverscapes (3 and 4 are not only specific to Bagmati-Balkhu), and hence were used as a starting point in my inquiry into stakeholders views and views which were revisited later. The idea was to create information-oriented categories – each with a different perspective to provide due to their varying characteristics and priorities (Flyvbjerg, 2011).

Once the concerned population was roughly defined, there was a need to specify the sampling frame – a list constituting of all individual/organizations from which the final sample will arise (Igwenagu, 2016). This was done through vigorous reading and note taking from the various literature review sources. At first each and every stakeholder/ individual/organization mentioned throughout was made a note of. Then once majority of the sources were covered, the list was stratified such that homogenous subgroups were generated within the list. This was done in the hopes of being more reflective in the population representation. Once the list was more manageable, each entity in the list was accompanied by their contact details available on the internet (email, phone no.). Hence the final outcome was an exhaustive list ready at the researcher's dispense for the next step of the process (Annex-1).

- **Contacting the samples:** This step of the interviewing process proved to be one of the most challenging ones. It is known that despite choosing the sample on the basis of good logic, many proposals for participation in the methods are left with no responses (Igwenagu, 2016). The hurdles only increased due to the attempt at making contact entirely digitally. But the option of making physical visits was not an option, hence requests for interviews were made through emails and messages on social media (Facebook in this case). The exhaustive list generated earlier (Annex-1) was utilized in an attempt to reach out to as many of the stakeholders as possible. While the objective was not to interview everyone, the entire list was contacted in the knowledge of probable non-responses. While the final responses were from a handful the list included at least one individual/organization of all the main stakeholder subgroups. An important lesson during the process was the need for adaptation to the interviewee's availability (Yin,1994), even more so since the researcher lived in Trondheim, Norway, whereas most of the interviewees resided in the different time zone Kathmandu, Nepal.

- **Interview question design:** In all the scheduled interviews, in my role as the researcher I came prepared with a list of relevant topics and a tentative interview guide. This preparation was based on the substantial foundation formed by the theoretical perspectives, the literature review done earlier and based on my local knowledge. But the guide was constantly reviewed and adapted in each interview as per the need of the moment. While there were more than 2 stakeholder groups, the interview type was divided into 2 broad categories – residents and organizations (Annex-2 and 3 for interview guides). Hence the framework of their interviews differed slightly. The residents were questioned more on their personal memories and experiences around the riverscape, whereas individual from organizations were encouraged to bring forth their work around the riverscape. But the common ground was to establish

a pattern of transformation as seen by all different parties – whether it was in terms of the agendas followed by the development projects, or the imagery created by it throughout history. All in all, the interviews aimed to merge the multiple stories, experiences, perspectives from differing subgroups, into one that can boast of a representative reality (DiCicco-Bloom and Crabtree, 2006).

Some basic guidelines for the questions were followed to ensure a fruitful and healthy conversation (Igwenagu, 2016):

- ✓ The number of questions should not be too lengthy, and the language used should be simple and easy to understand. If not, the researcher may lose out the interest of the interviewee.
- ✓ The order of the questions should show a logical flow such that it does not come across as rigid and uncomfortable. In the process of a semi-structured interview, many responses may be overlap into addressing more than one question. In such cases questions should be adapted to not sound repetitive and unproductive.
- ✓ The open- ended nature should be maintained throughout the interview, as leading or close ended questions can usher the discussion into a bias.

All the interviews were planned to be conducted orally through “zoom” – which is a digital video/voice calling platform. The ability to connect in real- time provided the researcher the opportunity to keep the conversation inviting and be available for clarifications where needed (Igwenagu, 2016). “Zoom” was a beneficial tool as it allowed the recording of the entire call, which the researcher could come back to time and again to transcribe as well as check details.

3.4 Limitations and Challenges

Every research or field work comes with its own sets of limitations and challenges- which should be taken in a positive stride and adapted around. This thesis was highly defined by the challenges presented by the still on-going Coronavirus Disease (COVID-19) pandemic.

- **Physical distance from the case study site**

Due to the ongoing pandemic, travelling to Nepal from Norway is not recommended. Hence the field work had to be done completely digitally. This was a huge concern, as I had to rely vastly on my professional and personal contacts to gather data. While they were extremely helpful, there was always the challenge of providing understandable as well as effective instructions for them to follow. Hence, the methods were designed to be clean and simple, and revised when becoming too complicated. The inability to be on site myself also took away my opportunity for first-hand experience and analysis. But nonetheless, the material available (photographs and videos) were used as extensively as possibly, despite not being first-hand.

- **COVID-19 lockdowns in Kathmandu Valley**

When the field work had initially begun, the pandemic had not massively impacted Nepal, and the Kathmandu Valley. Hence lockdowns had not quite started allowing for some flexibility. But a few weeks in, heavy lockdowns and restrictions were imposed in the Valley. This restricted my field assistants to go out and collect the required data. Hence there was a lot of delay, for which I had to be patient and wait for the gaps in between the lockdowns.

- **Need for sensitivity during the surge of COVID-19 in Kathmandu Valley**

In 2021, the COVID-19 cases in Kathmandu Valley sky-rocketed. It caused fear and uncertainty in unimaginable ways. Almost every family had been infected, and the whole nation was struggling to keep the health system from completely failing. In such a critical period, it was extremely challenging for me to put aside my own worries of my friends and family back home. It was even more difficult to contact my field assistants as well as interviewees to continue with my data collection. I had be extremely sensitive of the time of crisis and allow people to take as much time as needed to get back to me. This also meant some previously confirmed interviews had to be cancelled, and some reduced to short email exchanges. Nonetheless, other sources and methods were utilized to fill the gaps created.

3.5 Revisiting the methods

While the above section discussed the special case of COVID-19 related challenges, some more unexpected (and some mildly anticipated) issues came up once the methods were in play. These issues were taken into regard and the methods were adapted accordingly:

- **Visual time series:** 4 different sources were used to get access to photographs for this, and each source gave a very different type of image making it slightly hard to compare them. Moreover, I was able to receive personal photographs from only 3 contacts and of very limited time periods. As for the digital maps, only 2 maps could be accessed due to the COVID-19 lockdown. Meanwhile the google Earth satellite images only started from the year 2003. Hence overall, each source had many gaps, but at the same time they sufficiently filled each other's deficits. While compiling the collections, I also realized that the amount of images received were ample in enriching the case study, and too many more of them might have overwhelmed the readers.

- **Video observations:** While the videos were planned and instructed to be taken on very different days and time periods, all of them could not be covered due to busy schedule, and later Covid-19 lockdowns. There were some overlaps in the timings, but the purpose of variety was still achieved. Moreover, the instruction for the video capturing was to record both the Sanchal and Balkhu side of the riverscape. While Sanchal was easy to access and capture, the same cannot be said about the Balkhu side as it consisted of a very dense squatter settlement. Due to ethical privacy regulations, researchers are not allowed to record any footage without people's full consent. Since the Balkhu squatter is very densely packed, it was not possible to record the stretch without regular appearances of people. So other sources were relied upon to create the base knowledge of the Balkhu side.
- **Semi structured interviews:** It has been already clarified that many interviews had to be reduced to short email exchanges or cancellations due to the sensitive situation of COVID-19 in Kathmandu Valley. Besides that, some interviewees preferred sending in written answers. While efficiency wise it greatly decreased the task of translating and transcribing, it also took away the opportunity to ask cross-questions which were possible in other oral interviews. For rest of the interviews, the task in hand was thus, translating from Nepali language to English, which could have sometimes lost the true essence of the statement.

Another development of the interviewing process was the emergence of "informants". These were interviewees who went beyond listening in assisting in the discussion, such that they enabled access/suggested examination into more resources and professional contact (Yin, 1994).

Finally, once the interviews were completed, I realized that there was a need to revisit the categories of the stakeholders as well. Initially I had created 4 sub- groups on the basis of initial literature review:

- Bagmati-Balkhu riverscape and area residents
- Bagmati-Balkhu squatter settlement residents
- Activists and NGO workers
- Governmental organizations representatives

But with better clarity after having worked on my thesis further, it felt more suitable to divide them into the following 6 sub-groups:

- Governmental authorities
- Local residents
- Squatter settlement and supporting organizations.
- Non-profit organizations
- Local businesses
- Local health and educational institutes

Overall, despite many disruptions and challenges, the outcome achieved remained satisfactory and, in a way, reflective of the current scenario of unavoidable uncertainty. This made me appreciate my field assistants, informants, and interviewees even more, as they put in a lot of time and effort in the face of their own pandemic related stresses. Additionally, it was a key lesson to be able to continue and adapt to whatever the situation calls for. In a manner of speaking, dealing well with uncertainties in field-work is also a huge take away of the UEP approach- making it a big and inevitable part of the learning process!

4 Context of the Research

With UEP's contextual approach being used as a crucial theoretical base, it is quite cardinal to have a grasp on the context of the study area. The research is rooted within the transformation of a riverscape located in Kathmandu valley, Nepal – the Balkhu-Sanchal riverscape. Hence, the objective of this chapter is to build a factual foundation for the readers to better understand the different and interlinked levels of context of Nepal, Kathmandu valley, and its relationship with the Bagmati river. These are all crucial towards addressing the opportunities and challenges ahead of us, specific to Balkhu-Sanchal.

4.1 Nepal

Nepal is a South-Asian country covering an area of 147,516 sq.km, landlocked by China and India. Internally, the country is divided into 5 physiographical regions (Fig. 4-1): The High Himalayas, the high mountains, the Middle hills, the Sivalik hills, and the southern Terai plains (Aryal and Shrestha, 2011). Our study area is located in the administrative capital of the nation- Kathmandu valley, which lies in the middle hills.

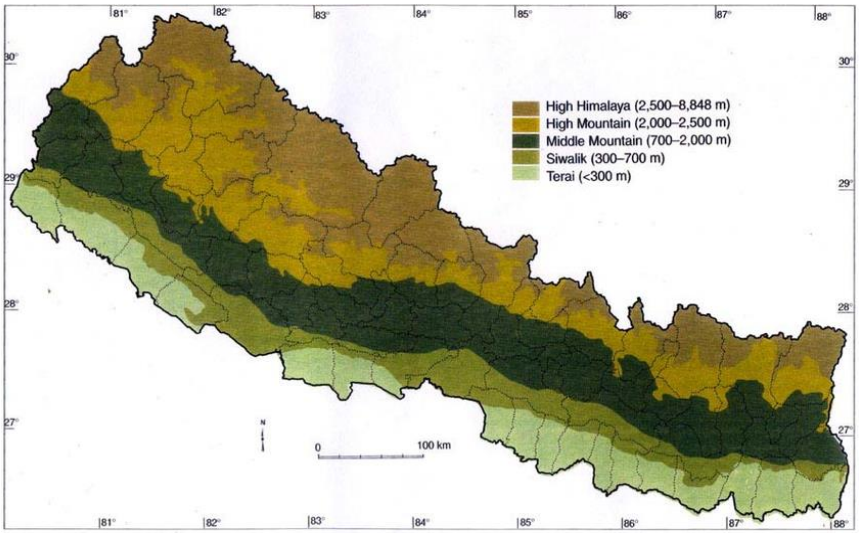


Figure 4-1 The 5 physiographical regions of Nepal (Bothara et. El, 2018)

Earlier, Nepal consisted of 5 developmental regions, 14 zones and a total of 75 administrative districts (Pant and Dangol, 2009). The rationality of the division was the detailed study of the lowland to highland interaction as well as migratory patterns, in pursuit of regional development planning (Gurung, 1989). But when 2015 brought in the new Constitution of Nepal (presently the governing constitution), the development regions were replaced by the 7 provinces assembled from the retained 75 districts (Fig. 4-2). Nepal is now officially the Federal Democratic State of Nepal with 276 (urban) municipalities and 460 rural municipalities under it (Wikipedia, 2021). The Kathmandu valley is situated within Province no. 3 – Bagmati.

Figure 4-2 Map of Nepal with provincial and district divisions (N C Thakur, 2021)

The most recent census of Nepal was held in the year 2011, which is understandably outdated by 10 years. But the data still can provide a decent idea of the socio-cultural, economic, and political landscape of the nation- all integral aspects of the urban ecology. The 2011 census placed Nepal at a population of 26,494,504 with a growth rate of 1.35 % per annum (CBS, 2011). Several projections have been made calculating the current

population to possibly stand at a whopping 29,583,618 right now (Worldometer, 2021). Out of the total only 17.6% resided in urban areas in 2011, which possibly has grown to at least 21% (Statista, 2020).

4.1.1 Socio- cultural and economic overview

Up until 2015, Nepal was known as a Hindu nation. But after the promulgation of the new National Constitution in 2015, it officially became a secular democratic state. This was a vital step towards reflecting the reality that more than 8 religions are being practiced in Nepal even though Hinduism still stands at a massive 81.34% of it (Fig. 4-3). Culturally speaking, Nepal is a conglomerate of 126 ethnic groups and subgroups speaking a total of 123 languages (CBS, 2011). While this ethnic diversity is something to be largely proud of, it has also proved to encourage societal vices in the form of caste-based discrimination (Bista, 1991). Due to an age-old hierarchy within the castes, the powerful remained powerful, and the less fortunate became more vulnerable. While this was a very rudimentary practices, its traces are still found in the modern Nepalese society. However, urbanization and universal education has fortunately contributed to cast mobility. The origin of this system will be discussed further on, later in this chapter.

	2011
Hindu	81.34
Bouddha	9.04
Sikh	0
Bahai	0
Christian	1.42
Islam	4.39
Jain	0.01
Kirati	3.05
Undefined religion	0.23

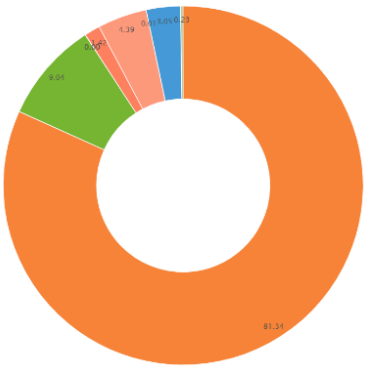


Figure 4-3 Charts showing the percentage of each religion in Nepal (CBS, 2011)

Nepal as a nation has always grappled with poverty. With a low GDP per capita of $1071 in 2019 (World Bank, 2021), the latest official government data revealed that 21% of Nepalese still struggle under the poverty line4 (Nepali sansar, 2018). While it is a sad reality, it is actually an improvement from the 25.2% in 2011. There are various factors that can strongly bring down the poverty, one of them being education. As of 2018, Nepal has a literacy rate of approximately 68% (Fig. 4-4), a number that has been in constant rise (UNESCO, 2020). This number account for 75% literacy in males, 57% in females; and 62.49% in rural areas, 84.22% in urban areas (CBS, 2011).

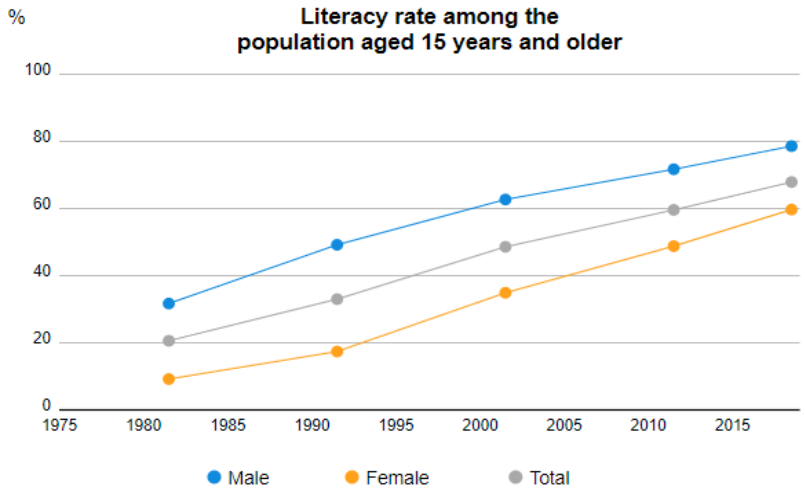


Figure. 4-4 Literacy rate trend in Nepal (UNESCO, 2020)

Due to the possession of fertile lands, Nepal has predominantly been an agriculture-based country, and the trend continued through 2011 (Fig 4-5). The practice is more prominent in rural areas, due to the need for large cultivable lands. But these agricultural lands are rapidly being lost to increasing urban sprawl. This has initiated a downfall in the agricultural livelihood and has forced many to seek out more

[4] The national poverty line of Nepal is $1.90 purchasing power parity (PPP) per day. (Asian Development Bank, 2021)

employment opportunities which unfortunately the rural lacks. Hence many seek out to migrate to urban areas, in hopes of a better life quality and services (Mahaseth, 2017).

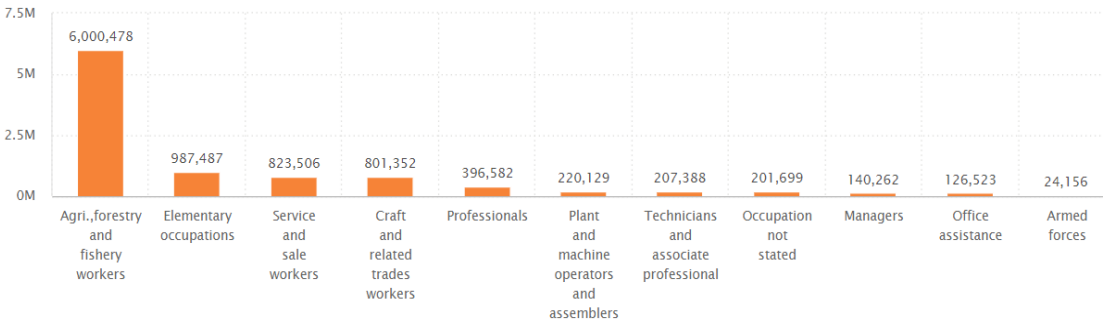
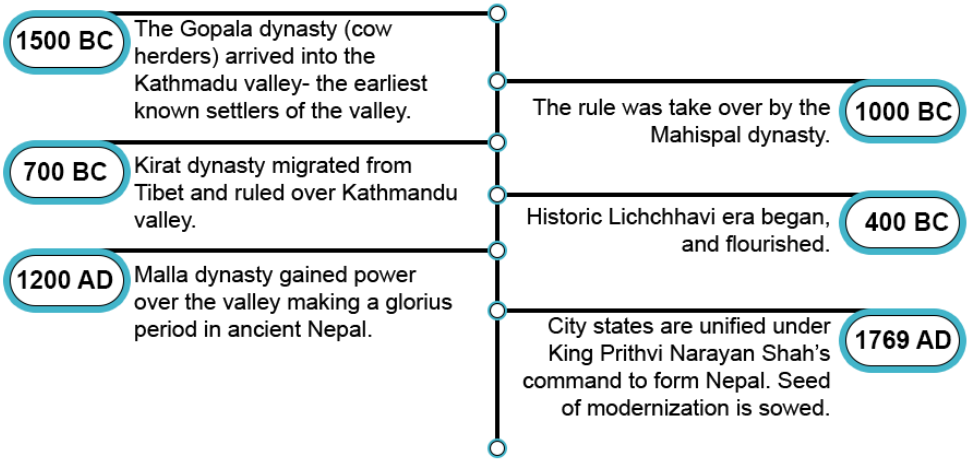


Figure 4-5 Occupational distribution in Nepal (CBS, 2011)

4.1.2 Political overview

It has already been stated in the previously that the case study will follow a chronological order. Therefore, it is reasonable to also look at Nepal's political history as a timeline (K.C, 2020) (Singh, 2016) (Tiwari, 1999) (Mahaseth, 2017).



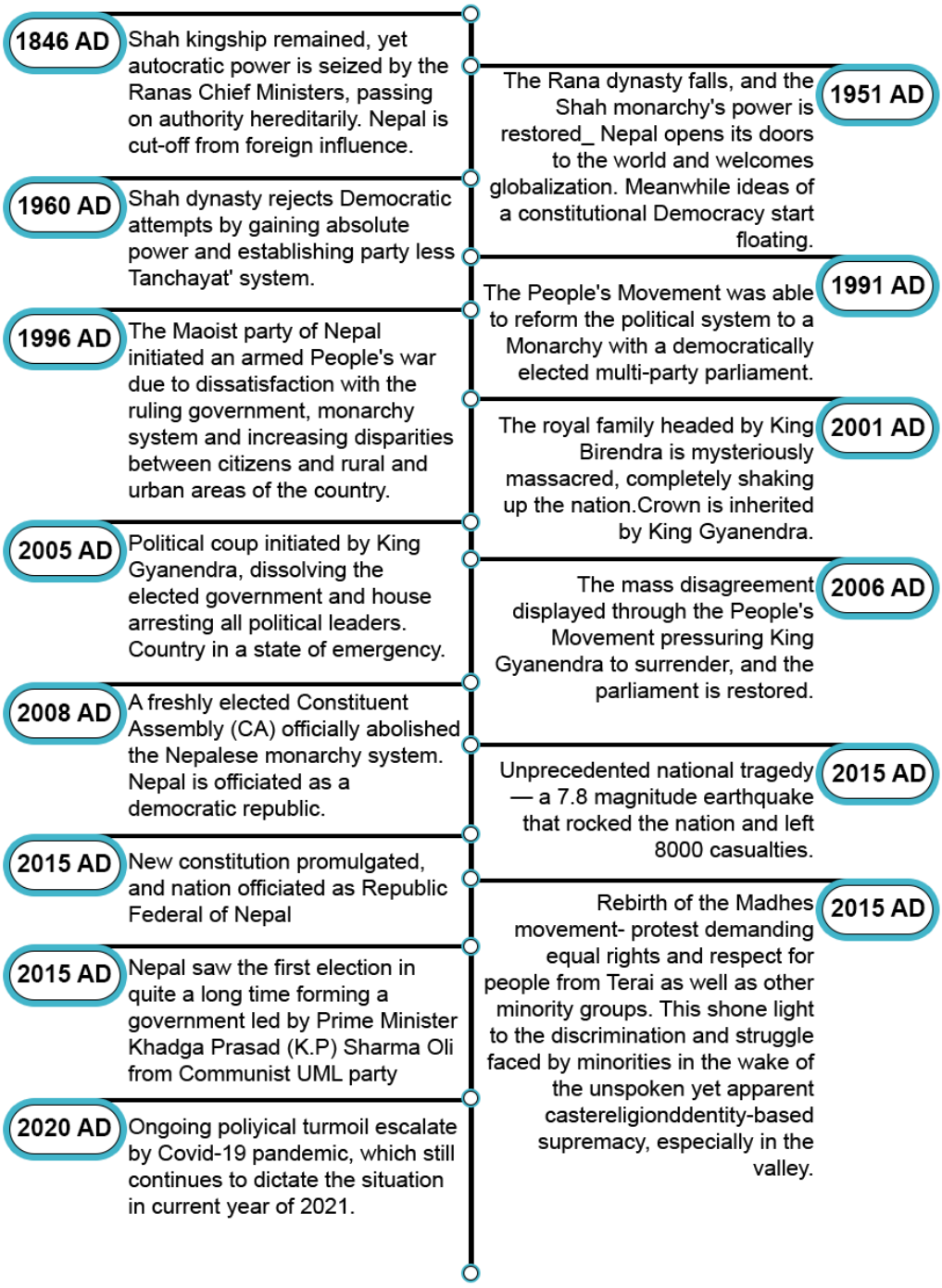


Figure 4-6 Timeline of the Nepalese political history (author, 2021)

From the ancient kingdoms to early fifties through faces of a one party Panchayat kingdom, to multiparty kingdom, civil war, and radical changes to a multiparty republic with a new constitution in 2015- all phases have had drastic variations on the valley's predominant agriculture, specialized advanced crafts and traditional living city culture. Now immigration, modern lifestyles, consumption patterns, city planning principles, have as a reaction wildly changed our city and the citizens relations to and treatment of their environment, in sharp contrast to historic cultural traditions.

4.2 The origins of Kathmandu valley, in relation to the Bagmati river

While globalization today has somewhat made most places look homogenous, the same was not the case centuries back. Without limited mediums to allow interchange of ideas and lifestyles, most secluded regions of North India and the Himalayas developed their own strong cultures and religions as time went by. The influence was so strong that the entire "imageability and identity of the city is seen to be guided by the religious and socio-cultural belief" (Singh and Tiwari, 2016, pp. 255). This was very much true in the case of Nepal, and Kathmandu Valley since its very origin.

The valley has always been valued as highly fertile. Scientific findings have pointed out that the valley could have originally been a lake, and hence the fertile lakebed soil we see today (Tiwari,1999). Very popular mythologies suggest the same. As per the Buddhist legends, the lake water was drained out by Bodhisattva Manjushree with a mighty sword cut into the Chobhar gorge. As for the Hindu variation of the myth, it was Lord Vishnu himself who did the deed and created the sacred valley (K.C, 2020). Such stories of sacralization exhibits the dominance of theocentric belief in the early societies which motivated the common population to look always search for a superior power for guidance. So, when people saw the almighty forces of nature, they acknowledged them as forms of Gods (Tiwari, 2002), hence treating them with due respect. Similarly, the

rulers of the olden times were revered for their powerful leadership and hence considered descendants of gods. This idolization has largely defined the early formative phase of the valley.

4.2.1 Gopala and Mahispal Dynasty: 1500 BC- 700 BC

The valley's very first settlers who can be traced back to are the Gopalas. Primarily cow herders, the Gopala dynasty are interestingly considered the true ancestors of the current Newar population (Tiwari, 1999). As per chronicles, they arrived from Southern India in 1500 BC, and enjoyed their reign for 500 years to come (K.C, 2020). Then in 1000 BC, the Mahispals (buffalo-herders) took over control of the valley, but only ruled for some 100 years to come (Dangol, 2010). What both Gopalas and Mahispals had in common was their inclination to a more tribal society, meaning they did not leave behind much remains of a settlement.

4.2.2 Kirat Dynasty: 700 BC- 400 BC

700 BC saw an influx of migrants from Tibet of Kirat dynasty. They were the first ones to lay down the historic foundation of settlements in the valley. It was known as "pringga", and they were consciously developed only on the "tar" (higher reaches of the hills) as they are the most unsuitable for irrigation. By doing so, they saved up the "dole" (hill slopes) and the "tala" (fertile plains along riverbanks) for agriculture (Tiwari, 1999). With this very simple and logical decision on land use practices, they made way for an eco-sensitive tradition, which continued through another interesting culture of designating two types of deities as protectors of the settlement (Singh, Tiwari, 2016). While the first deity "Dathutole" was meant to be placed centrally as the in-town protector, the second deity "Pithu" was placed out of the town in a strategically natural and eco-sensitive location (K.C, 2020). By doing this, the Kiranti rulers very brilliantly

kept the boundary of the town under limits, and rightfully protected the nature around them. Such regulatory behavior quite simply reminded people of their duties, without which they could not reap the benefit of the deities' protection (Tiwari, 1999). These helped the Kirat dynasty to flourish for a mighty period of 1225 years (Dangol, 2010).

4.2.3 Lichchhavi Dynasty: 400 BC- 1200 AD

In 400 BC a new legacy started forming in the valley through the arrival of the Lichchhavi from the southern plains. As most ancient settlements, they too were widely motivated by religion, and hence followed Hindu/Buddhist doctrines to develop gridiron town formations (Tiwari, 1999). Unlike the Kiratis, they did not shy away from creating new settlements on riverbanks and even went on to extend the existing Kirat towns to the "dole" s and "tala" s (Singh, Tiwari, 2016). In fact, two of their majorly concentrated towns – Deopatan and Hadigaon, both were on the famous riverbanks of Bagmati and Dhobikhola respectively (K.C, 2020).

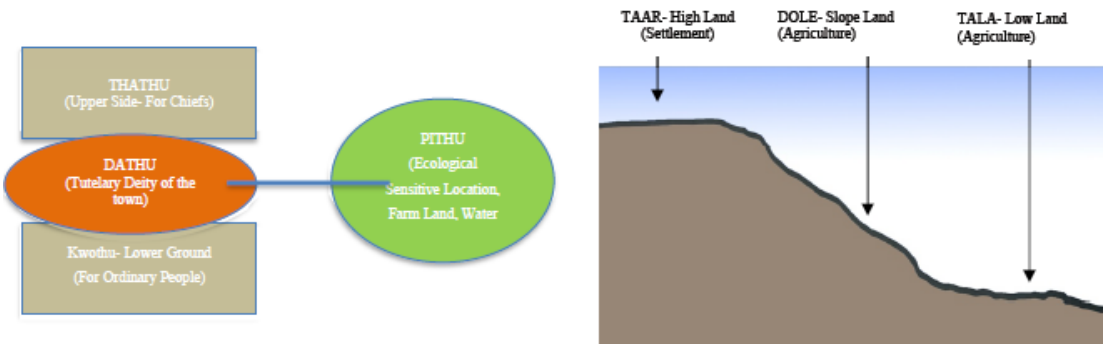


Figure. 4-7 Kirat settlement patterns (K.C, 2020)

A deeper look into Lichchhavi town morphology showcases traces of Vashtushastra – which is an ancient Vedic knowledge that promotes the integration of natural elements within architecture and planning (Singh, 2015). Moreover, zones for dwellings, occupations, vehicular movements all were allocated as per the "Shakti mandala"

concept- which preached the principle of a central power around which everything else revolves. Adapting this concept into a social viewpoint, people of higher order were given right to reside centrally. And the rest spread out radially as per their social ranking (K.C, 2020).

With vast fertile grounds and many other natural resources at its dispense, the Valley's prosperity was growing and no doubt, so was the sphere of activities (Shakya, 2011). This meant the town limits were expanding to cover an environmental area much beyond the idealized ecological micro level set in the Kirat era. Thus, the natural boundaries defined by Kirat "Pithu" s were not only exceeded, but also the natural water sources protected at these points were not enough to meet the demands.

- **Lichchhavi Dynasty's efforts towards nature and water management**

Figure 4-8 Pit conduits decorated with symbolic motifs (Tiwari, 2002)

This growing need for water encouraged the Lichchhavis to utilize canals to feed water into the low town reservoirs from the foothills. This technique was initially already realized by the Kiratis who called such canals – "tilmaka". This advanced into the "pranali jaldroni" in the Lichchhavi period (Singh, Tiwari, 2016). The end goal was to supply water to stone-pit water conduits, that were used widely by the public and now are famously known as "hiti" s (Tiwari, 1999). These conduits were beautifully integrated into the town's cultural identity through decorative motifs (Fig. 4-8) that symbolized forms of Lord Shiva supporting the flow of the water (analogized to holy Hindu rivers such as Bagmati) (Tiwari, 2002). While this section highlights the importance given to man - made water systems, it is vital to understand that the adequate and timely introduction of such systems also allowed the Bagmati river to thrive without the load of fulfilling the needs of the settlement.

More efforts towards conserving water quality were seen in this era, as proofs were uncovered pointing to existence of various filtration technologies. One outstanding ecological technique used was the ritualistic offering of large amount of the fruit "lapsi" into the valley rivers- which worked well with the sand to form a natural filter that kept bacteria at bay. Later more natural elements were introduced into the water systems that had similar beneficial properties such as – copper pipe, white earth, limestone (Singh, Tiwari, 2016).

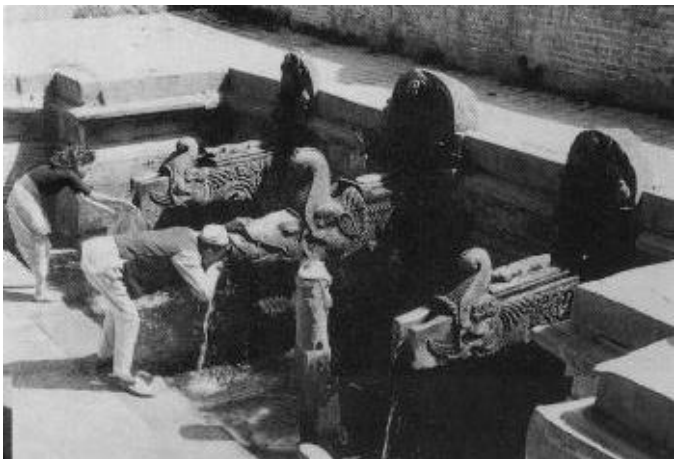


Figure. 4-8 Pit conduits decorated with symbolic motifs (Tiwari, 2002)

While the original Kirat town limits had already been crossed, it was crucial to not let the growth of built up area go uncontrolled. Hence more religious devices like ritualistic festivals and ecologically placed shrines (of "Ashtamatrika" - Eight Mother Goddesses) were introduced to upkeep religious discipline (Shakya, 2011). Using theocentric emotions of the community as a management tool played out beautifully, as they would simply not dare to go against their own religious ethics. And thus, like clockwork people respectfully abided by the guiding principles for religious and ecological maintenance practices with no need for a top-down legal management (Tiwari, 1999).

4.2.4 Malla Dynasty: 1200 AD- 1769 AD

The Malla period is widely known for its grand culture, festivities, architecture, art, and traditions that still live on (Fig. 4-9)(Dangol, 2010). The Mallas belong to Newar ethnic group, who have been often called the indigenous inhabitants of the Valley. Their origin goes back to Gopalas – the first settlers of the valley and are considered a mix of Indian and Tibetan roots. This blend can be often seen in their various cultural practices till date (K.C, 2020). Their urban fabric constituted of multistory brick dwellings arranged in dense courtyard clusters. While most of the houses shared a common wall and a common inner courtyard, they were briefly divided by narrow alleys in between. This created hierarchies of well-integrated public and private places, and also ´tole´ or neighborhood town subdivisions. Their streets were paved with traditional brick tiles that uplifted the aesthetics of the open public spaces that were scattered around architectural marvels. Interestingly what their towns lacked greatly was greenery. To compensate for that, huge green open grounds were allocated in proximity of the towns that were employed for annual congregations (Tiwari, 1999).

Unlike their most recent predecessors, the Mallas chose to create their empires away from the valley rivers (Tiwari, 1999). Instead, they took a hint from the Kirat era, and allocated mostly higher lands for settlements leaving the lower areas for farming purposes (Shakya, 2011). But it was apparent that the flourishing town was growing much beyond the control capacity of a singular Kirati “Dathutole” (called the “Dyochen” by the Newari Mallas- meaning home to the gods) and “Pithu”. This demanded an adjustment to the previous system, so that a balance can still be maintained. And hence there on, the “Shakti Mandala” principle was followed- the urban form revolved around the arrangement of deities This theocentric guidance implemented a sense of boundary and hierarchy that felt natural to the already religiously driven society (Tiwari, 2008). This arrangement also naturally created street patterns with junctions that became potent as cross caste meeting points and religious pitstops for festivities.

While the "Shakti Mandala" system helped regenerate a religious means for control, there was need for more reinforcement. Hence an evolved version of a Kirati social system was brought back into practice by the Mallas. It was the social vertical stratification based purely on occupations, which is famously (or infamously) known as

Figure 4-9 Ancient towns created by Mallas that still live on (Oldfield, 1880)

"Jaat", or caste, system (Tiwari, 2008). With no linkages to religion per se, Mallas divided people into 84 professional categories (Tiwari, 1999). While in today's world the Jaat system comes attached with a negative prejudice, it was originally an attempt for a harmonious zoning system that created a pocket for each family to flourish in. Each of these sections would then have dwellings around a celebrated religious symbol. Here they could work from the comfort of their home and build a strong and thriving working community amongst themselves. This consequently meant less intra-town movement which benefitted the entirety of the town by reducing all kinds of chaos and expansion (Tiwari, 2008). As for the location of these pockets, it was determined in relation with

the central power (the royal palace and major temples). Now since the idea was to decrease movement, the various pockets were arranged as per their "Jaat" or occupation's need for consultation with the palace. So, groups with higher social ranking settled centrally, while the others dispersed hierarchically towards the periphery. This meant lower castes with professions such as butchers, sweepers etc. were pushed to the edges and mistreated as "untouchables" (Shakya, 2011). While the "Jaat" system boasted of providing some form of structure to the society, it has also aided social injustice and discrimination, and segregation throughout Nepalese history. However, in our contemporary society caste mobility is fortunately facilitated by improved access to education and non - caste related work opportunities.

- **Malla Dynasty's efforts towards nature and water management**

While the Mallas did not create towns right next to the river it does not mean they did not have a strong relationship. In fact, the decision to locate the urban settlement and main activities away ensured Bagmati was guarded from dangers of degradation. However, there were exceptions: areas for slaughter of domestic animals (e.g., water buffalo), composting areas of agricultural waste, and cremation ´ghats`. Overall, the Newars showed brilliant natural resource management that were cleverly and "quite consciously built-in cultural practices, which did not develop naturally over long period of experimental phase but were developed, timed and implemented by those who were responsible for properly directing development" (Tiwari, 1999, pp. 6). No wonder the rivers of ancient times were pristine enough to be drinkable. Some of the management codes that were directly linked to their sense of duty towards the Valley rivers are as follows:

A. **Traditional water supply systems:** The growing valley population had obvious growing needs that included daily water supply. Hence the stone pit water conduits or "hiti" s were replicated all around the town to cover more ground. The canal

technique had been passed down and modulated into “rajkulo” (Khadge, Tiwari, 2014). Hence once again the population received adequate water supply, without having to extract and take away from the glorious flow of Bagmati or any other Valley rivers.

B. **Sacralization of the river:** Sacralizing ecological components as a means to preserve them, has already been established as purposely applied technique of ancient Kathmandu valley. The same thus goes for the Bagmati river, which can be seen from the very formation of its name. The most generic etymological understanding of the name is that it is the amalgamation of the two words “Bag” and “Mati” – meaning the river that flows through the mouth of the tiger (as the source of the river is a sprout known as the “Bagdwar”). Besides that, popular connections have been made saying the name is a twist to “Wagmati” - the goddess of speech, words, and mantras and hence a holy form of Hindu Goddess Saraswathi herself. (Shakya, 2011). What all these associations have in common is that they all portray the river in a position of power and divinity meant to be worshipped.

This symbolic sacralization of all rivers including Bagmati has been evident throughout Hinduism. And due to this sacred status, Hindus have chosen the rivers to be the final resting place for the soul. As per religious beliefs, a human body is a divine combination of 5 natural elements – water, air, fire, soil, and sky. So, when a human life ends, the body should be disposed in such a way that these constituents can be returned back to nature. Hence Hindus have the culture of cremating their deceased on riverbanks, such that once the cremation is completed, the ashes can be dispersed into the rivers. In the case of Kathmandu valley, Bagmati river fulfills this ritual (Dangol, 2010). This encouraged an urban form in the Malla period where back streets were especially defined and constructed to lead people to the riverbank cremation sites (KC, 2020).

These crematory rituals persist till date. In the ancient times the river was devotedly protected from impurity, as it was seen as the final passage for the Hindu soul. Since earlier the flow of the river was high and strong, the organic offering of ash did not create any natural imbalances or degradation. The same cannot be said today, as much more than organic waste gets mixed into the already overwhelmed polluted river.

Besides cremation, many more rituals have been going-on on the Bagmati riverbanks such as - "shraddha" (annual rites done for peace of a deceased soul), "Vrata" (fasting in the name of gods), "Du Byankegu" (purification process after mourning of the dead), holy bath (act considered to wash away all impurities and sins). All these helped keep the prestige of the river high through the Malla period.

C. Festivals: Festivals were another great way of exercising discipline in the guise of emotionally valuable celebrations. Most festivals were intricately linked to a peasant's life and the agricultural cycle. The Malla society very cleverly utilized voluntary labor, who came forward to contribute in the hopes of gaining good "karma" points for a successful reincarnation (Tiwari, 1999). Various annual rituals in the form of the "Satyanarayan" festival, "Macchindranath" festival, "Sithi nakha" and "Nagh Panchami", were dedicated to celebrating the value of water sources and supply systems. As part of the celebrations, common people would come together and help clean and maintain the water sources - a means to please the gods (Shakya, 2011).

D. Traditional waste management system: The modern water-based sewage system had not emerged yet during the ancient Malla times. Hence the negative practice of waste disposal into the rivers never came into being then. In fact, it was vital for the Malla society to keep the river - a form of God in itself, as clean

as possible. As an outcome, they developed and adopted traditional forms of waste disposal and management that was excellent in "closing the loop" on waste.

a. **Kitchen and other daily waste:** The system began with "Dhow Pyo", which was a traditional Newari sink made out of burnt clay. Placed in the kitchens, it was used to wash away wastewater. It was then connected to a collection pit called "Sagah"/ (Nepal, 2013). Literally translating to a manure pit in Newari language, "Saagah"s were placed in the open backyards of traditional houses and many times shared among household within the same cluster. This excavated pit welcomed not only the kitchen wastewater, but also other solid waste. And since inorganic materials like glass and plastic were not in use back then, all matters collected were purely decomposable. Once the components reacted with each other naturally and dried out, they were used as manure for the crops. Hence all organic nutrients were returned back to earth, with no residual waste (Shakya, 2011). Furthermore, outlets were made in the "Sagah" called "Byeku Pwo", that basically had the task of conveying the extra wastewater out to collector drains through earthen conduits called "Nali". This water was finally either given out directly as irrigation to crops or disposed into pond systems – being oxidized naturally as it gets stored for future irrigation use (Nepal, 2014).

b. **Human waste:** While kitchen and other daily waste was processed through the "Sagah" system, human waste was collected into traditional pit toilets called "Naugah", located on the ground floor of dwellings. It was prefilled with ash, so that the human waste could react and mature to become crop manure in a few months' time. When such separate in-house toilets were not in use, communities allocated communal toilet streets called "Khikhan Mugah" towards the outskirts

of the settlement. This too was periodically cleaned and collected to be used as manure.

While the above systems had great positive implications for the natural environment, it could also easily cause health hazards if not maintained properly in dense built up environments. Hence once again religious motivations were instilled into the society in the form of "Pahachahre" festival. The rituals of this festival included seasonal cleaning of such waste collection pits/zones. Since there were no convenient modern technology at hand then, people dedicatedly followed the norms and kept the system running flawlessly (Shakya, 2011). The Bagmati river thus did not have to face heinous pollution for the time being.

E. Guthi system: Guthi is a social organization indigenous to the Newars. They were formed with the objective of maintaining the Newari social structure, culture, and festivals, preserving physical heritage, upgrading living standard of the locals, etc. (K.C, 2020). With this common goal the guthi worked relentlessly to make sure the society was running smoothly, which consequently included safeguarding the Bagmati river. Much of their applauded devotion came from their sense of ownership and belonging to their community and surrounding environment. This practice has slowly died out in the present due to westernization among Newari people, as well as loss of communal land due to privatization.

4.2.5 End of ancient Kathmandu Valley

The ancient Kathmandu Valley came to an end through the fall of the Malla dynasty. While the Mallas had promoted small and manageable city-states, a new wave or centralized power was brought in by the unification of Nepal by King Prithvi Narayan Shah. And hence, came to an end- a glorious era that had helped maintain the beauty,

purity, and purity of the Bagmati river. Up until this point, human demands were under limits, an amount that could be easily catered to by nature without compromising with its health. And this service was appreciated by the people through the employment various natural resource and water management techniques. So, in a way we could say that both 'green' and 'brown' agendas were practiced in regulated manner, keeping things in balance. This could be credited highly to their 'theocentric' relation with the surrounding environment. The clever culturally motivated disciplining utilized by Kiratis, Lichchhavis and Mallas, all were impressive and showed the kind of environmental awareness they had. There are many lessons that can be learned from ancient Kathmandu Valley settlements:

- The use of temples to mark and regulate city growth.
- The use of festivals to create sense of responsibility.
- Local materials used such as wood and porous bricks for pavements, that allowed ground water recharge.
- Clustering of houses to create shared facilities and common courtyard to invite social activities.
- Waste management culture- 'closing the loop'.
- Sacralization of important ecological sites to promote their protection.

Overall, the image of the Bagmati river was far away from today's predicament.

5 Case Study and Analysis

This chapter attempts to build a case around the urban image transformation of a section of the Bagmati riverscape of the Kathmandu valley. To quickly refresh our memory on the established definition of a case study, it is an "intensive analysis of an individual unit stressing developmental factors in relation to environment" (Merriam-Webster dictionary, 2021). Here, our chosen "individual unit" is the "Balkhu- Sanchal" riverscape, marked by the orange outlined box in figure. 5-1.

Figure 5-1 Case study area of Balkhu-Sanchal (adapted from Google Earth by author)

To give a very brief introduction to the area enclosed:

- It lies on the junction of the Kathmandu Metropolitan city (KMC, ward no 14, on the left side) and the Lalitpur Metropolitan city (LMC, ward no. 2, on the right side), which is divided by the Bagmati river.

- It majority of the case study area constitutes of Balkhu tole of KMC and Sanchal tole of Lalitpur, hence our case study area is to be referred as the Balkhu-Sanchal riverscape.
- The chosen area bounds a section of the Bagmati river in between two of its confluences - the Bishnumati-Bagmati confluence on the north, and Balkhu-Bagmati confluence on the south (red circled on Fig. 5-1).
- It covers an approximate area of 20 hectares/ 0.2 sq km.
- The boundary of the case study area extends approximately 110 m on the KMC side, and 180m on the LMC side – from the Bagmati river.
- Though there is a mixed- used development, the dominant land-use here if of housing (whether formal or informal/squatter settlement).
- There are 3 major roadways that services the area –
    1. The ring road (which encapsulates the Balkhu bridge- black rectangle in Fig. 5-1- connecting KMC and LMC)
    2. The LMC Bagmati corridor road (Sanchal side)
    3. The KMC Bagmati corridor road adjacent to the squatter settlement (Balkhu side)
- Besides the above 3, various secondary roads and street networks run within it.
- My childhood house is located on the Sanchal side (marked by yellow dot on Fig. 5-1), where I lived until 2014.

Moving on to the structure of this case study, it will be presented as a chronological narration, which will aid in making comparisons throughout the transformation. The discussion will be in 3 periodical parts, where in each part will have utilized a different mix of methods (crossed boxes in Table. 5-1). This is due to the simple reason that all

methods could not provide information for all of the time periods but catered to at least one.

Table 5-1 The 3 periodical parts and the methods utilized for each (author, 2021)

Methods used \ Period	1951-1980	1980-2003	2003-2021
Literature review	☒	☒	☒
Visual time-series:			
• online pictures	☒	☒	☒
• personal photos	☐	☒	☒
• digital maps	☐	☒	☒
• satellite images	☐	☐	☒
Interviews	☐	☒	☒
Video observation	☐	☐	☒

Thus, as we journey through our 3 periods, we will assess how our dependent, localized variable – "Balkhu-Sanchal" riverscape – molds through the interplay of 'interdependent' variables like changing perceptions of human-environment relationships, the importance given to green vs. brown agendas, and the application of area based, urban ecological planning, and sustainable development based overall efforts.

In my theory introduction I started with the complexity of the present problem of addressing the urban environmental and developmental situation of the Bagmati river corridor in the Kathmandu Valley. I called it a wicked problem. I have in my previous contextual chapter addressed the Valley wide situation. In my case area study, I want to address a limited locality, with its potentials towards seeing ways out of wickedness.

5.1 Before the official establishment of Balkhu-Sanchal: 1769- 1956 AD

The context chapter had concluded with the discussion over the Malla dynasty's rule, which ended in 1769 through King Prithvi Narayan Shah's Nepal unification. The case study takes a jump from 1769 to 1956. Hence this section will provide a brief linkage between the 2 time periods. While the context chapter narrated the account of the whole valley, this section will describe the era with reference to the vicinities of the case study area. During this vast time period Balkhu-Sanchal riverscape was slowly transforming from being riverfront of cultivated floodplains without a distinct identity- to being used for mostly urban purposes. There were many things happening in the localities surrounding the Balkhu-Sanchal due to changing political/social and economic landscape of the entire valley. These incremental "developmental factors in relation to environment" (Merriam-Webster dictionary, 2009) will showcase how Balkhu-Sanchal image and identity came to existence.

5.1.1 The early Shah rule: 1769-1846 AD

Once a unified Nepal was set up in 1769, the Valley experienced an assimilation of culture. The Newars made space for new ethnicities to flourish in the valley, while also distinguishably maintaining their own cultural heritage (Tiwari, 1999). These latest migrants settled mostly outside the core old settlement, spreading the urban form into the fringe areas as city walls had now lost its gravitas (Shakya, 2011). But these sprawls took much time to reach the current case-study area, as Balkhu-Sanchal is situated at approximate equidistant from all of its nearest settlements' of that time (Kathmandu, Lalitpur and Kirtipur) (Fig. 5-2).

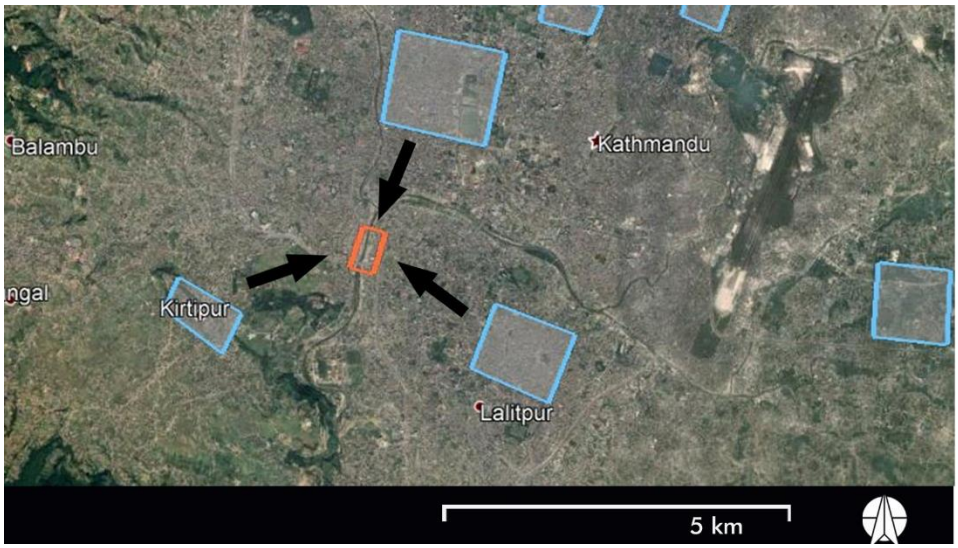


Figure 5-0-1 The case study area in relation to the original settlements from late 1700s (adapted from Google Earth by author, 2021)

Seeing this from an ecological point of view, meant the section of the Bagmati river within Balkhu-Sanchal riverscape was thriving, as it was majorly away from human activities and urbanism. But from another viewpoint- without human settlements the section also lacked cultural and social identity.

5.1.2 The autocratic Rana rule: 1841-1951 AD

The reign of supremacy was shifted Rana dynasty's prime ministers. To maintain their tyranny, the Ranas tightly controlled the migration in and out of the valley (Tiwari,1999). This consequently did wonders to maintain an ecological balance. Yet, from the very start it had become conspicuous that they did not actually care to sustain the enthralling cultural systems of the previous rulers. (Shakya, 2011). This once again proved that any development, even if it had good implications, was not done for the masses but only to add to the decorative grandeur and status symbol of the Rana rule (K.C, 2020). But serendipitously, their restricted form of development (whether green or brown) prevented extreme natural imbalances for the time being.

Particularly 2 developments of this era came very much close to Balkhu-Sanchal and helped commence its engulfment and settlement (Fig. 5-3):

- The Ranas initiated settlements encroaching into agricultural fields- which gave birth to the settlement in "Kalimati" (Shakya, 2011). As seen in figure no. below, Kalimati (marked with yellow outlined box in Fig 5-3) is a tole nearby Balkhu-Sanchal.
- The Ranas build the Teku Dovan (red-pinned in Fig. 5-3) riverside-development (stone ghat structures called "Bhakari" used for cremations- Fig. 5-4) (Shakya, 2011). This was basically an attempt to recreate the grandeur of the Indian holy river- Ganga (K.C, 2020).

Figure 5-0-2 Kalimati and Teku Dovan emerging near the case study area (adapted from Google Earth by author, 2021)

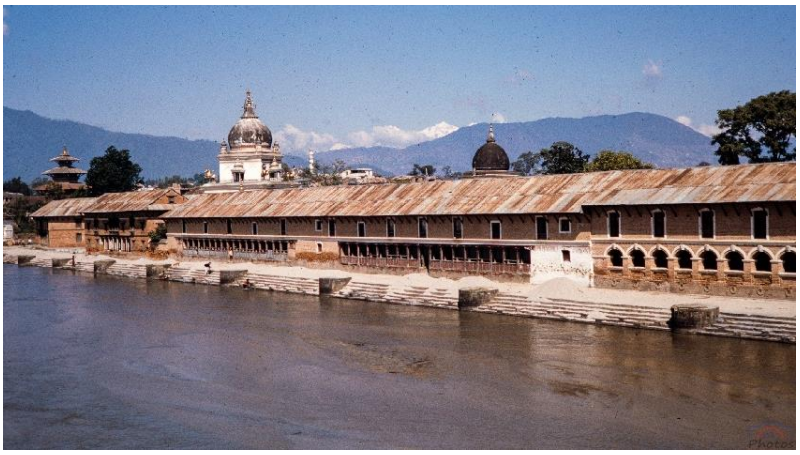


Figure 5-0-3 Stone ghat structures, used for cremation (Cooke, 1965)

5.2 Period 1 (1951-1980 AD): The case of the Balkhu-Sanchal riverscape

Up until that point Ranas had only allowed a slight amount of western influence to enter the valley, only ones that suited their needs and desires. So, while cultural degeneration had already begun from 1769, the process was catapulted forward with the end of Rana rule. Adopting "western" trends started becoming synonymous to "superiority". Soon this reckless and blind endorsement led to an unprecedented urbanization with wicked problems including river degradation. Therefore, in order to meet the growing demands, more and more services were being developed. Catering to such "brown agenda" seemed like the need of the hour, so it was taken forward with utmost priority. On the other hand, the natural environment was suffering.

It was evident that the perception of human to surrounding environment had changed radically. The theocentric imageability of nature had already begun its demise during the Shah dynasty. And it was almost completely replaced by an anthropocentric imageability after the 1950's. Nature was seen as just a means to an end for people's needs. And the whole of Bagmati river sure faced the brunt of this.

5.2.1 1951 – 1969 AD

In 1956, a substantial development came to life that altered the state of Balkhu-Sanchal. Nepal's first ever vehicular highway was constructed that linked the valley with the southern plains of Terai (Shakya, 2011). And the entry point was through "Kalanki", located only 2.3 km away from the Balkhu bridge. This not only aided access to huge number of migrants to the city, but also brought Balkhu-Sanchal much closer to urbanism with vehicular movement getting busier by the year.

While the concept of piped water supply had already entered the valley in the Rana era, it was only catering the elites. Now the undeniable right of the common people to access to same facilities was pivotal. Hence 1963's large scaled – 'Sundari-jal water supply" project introduced piped water supply system to the masses as well. The ramifications of this were seen when three monumental trends were set in motion:

a. The supply to the household required the diversion of volumes of water from "Sundari-jal"- which is in fact a point in the Bagmati river earlier to its entrance into the urban area. So, by focusing on the "brown" needs of the city, the "green" needs were undermined. With this extraction of water at an early stage, the healthy flow of Bagmati was starting to get compromised.

b. Water supply used to be a free public commodity for centuries through the use of traditional water outlets system like "hiti". They simply used water channels stretching out from higher located natural reservoirs to rejuvenate. But when unregulated construction of roads and building foundations started occurring, they disrupted the flow in the channels. So, conservation of such water heritages was becoming a challenge. Now when the piped supply system got introduced, people were astounded by the convenience of water coming directly to the houses. Hence the already dying out culture lost all attention,

and with it lost hope of conservation. Now the city is desperate to share the load of water demands, but it is hard to reverse the state of these water heritages (Khadge, Tiwari, 2014).

c. The modern infrastructure paved way for furthermore modern conveniences such as water-borne toilet systems. Along also came in new materials such as plastic seen in almost every type of packaging. There was a steady demise of traditional toilet culture and waste management system. The culture of creating "Sagah" s in the backyards had almost vanished by then, except in some rural areas. More and more people of the younger generations were refraining from handling wastewater on their own. The system of utilizing wastewater in agriculture also started to curb (Nepal, 2013). While in a smaller population it was easy to regularly maintain such traditional waste pits and keep it hygienic, with the increased population it was not possible. With majority of the population inclined to convenient water-based toilet mechanisms, the waste pits were turning into health hazards. Fortunately, or unfortunately, NGOs stepped in to abolish it completely. While it undoubtedly needed some modern adaptations, it's complete shunning also put an end to an age-old genius method of "closing the loop" on waste. Thus, waste produced started being lazily unloaded into nearby surface water.

While many sections of the Bagmati river in the core city had started seeing massive impact of the above trends, Balkhu-Sanchal was still freshly growing out of its hinterland identity. So even with growth in human activity and waste disposal, the healthy water flow allowed natural purification of the water till some extent. But the worst was yet to come as the modern water-based toilets were here to stay and being adopted in most new dwellings.

5.2.2 1969 – 1980 AD

In this period, a huge step that acknowledged the previously unimaginable urban expansions was the 1969's "Physical development plan for the Kathmandu valley". It was created with the help of the United Nations, making way for modern urban planning to finally enter the scene. This was a follow up after the establishment of the Town Planning Office (TPO) in 1962. The master plan devised projects as per 3 different zones (K.C, 2020)–

- Zone A - central parts of the city
- Zone B - outskirts of the city (Balkhu-Sanchal was part of this zone)
- Zone C - rural area further away from the city.

This promulgated various institutions and acts such as Town Development Committee Act (1966), Land Reform Act (1964), and Land Survey and Measurement Act (1962), all in favor of a developmental approach that focused on increased construction and land ownerships.

Around the same period, there were 2 major projects undertaken that credibly shaped the Balkhu sanchal area -

a. **Ring road project**: In 1975 the historic ring road was developed as a 28km of radial network that encapsulated some 4300 hectares of Kathmandu and Lalitpur. This road has been a milestone in generating the next phase of morphological changes, for better or for worse. This newly constructed ring road instantly connected rural peripheral areas like Balkhu-sanchal to the city core, making them more susceptible to urban development (Shakya 2011). The result was a spread that branched out into various networks of arterial streets connecting many of these pockets both outside and within ring road (Tiwari,

1999). And since Balkhu-Sanchal was right next to the ring road edge, its urban fate was sealed in.

a. **Kuleshwor housing project**: A 26.5 hectare sites and services housing project was initiated in 1977 in "Kuleshwor" (green circle below in Fig. 5-7), which is a Kathmandu tole adjacent to Kalimati and Balkhu. (K.C, 2020). Before this housing boom in Kuleshwor, the adjacent areas were enveloped by pristine natural beauty (Fig. 5-4 and 5-6). Whereas what followed the boom was a ferocious and unforgiving growth completely enclosing most of the green open spaces (Fig. 5-7).

Figure 5-5 Bird eye view of Kuleshwor in 1967 (Andrews, 1967)

Figure 5-6 Ground perspective of Teku Dovan in 1960's (Save Bagmati Campaign, 2021)

Figure 5-7 Top view of same area- Kuleshwor, as in 5-5 (marked by green circle, adapted from Google Earth)

And with that a final stroke was taken breaking all ecological boundaries that had been cautiously set in the olden times of Kirat, Lichchhavi and Malla. Now the cities were becoming more and more of a conglomerate. The value of developing, expanding, and regulating land had become the top priority of authorities which was apparent by the rising number of reforms that came one after the other in this period such as the Land Acquisition act (1977), and the Revenue act (1977) (K.C, 2020).

It was seemingly resembling a parasitic development. The priority of all developmental plans was being secured by large-scale structural or engineering projects, and somewhere cultural heritage was pushed into the shadows (Bjonness, 1994). To counter this, slightly more culturally inclined acts like the Land Reform Act of 1964 helped maintain the "Guthi" land system despite eradicating other traditional systems (Shukla, 2015). Thus today 3 forms of land ownerships exist-

- Government or public land
- Private or "raikar" (meaning land where tax can be levied) land, and
- Guthi land (designated for religious activities and help with expenses)

This retention of the guthi land system gave some hope for the dying system. More effort to sustain it was put in through the 1977 Guthi Sansthan Act, that enabled guthi to maintain and govern the records of their lands (NTNC, 2009). But the decline of the tradition was made even more challenging when systemized privatization of guthi land was allowed.

Unfortunately, there was lack of proper control for any kind of development beyond what had been prescribed in the 1969 master plan – which only focused on road connectivity issues (K.C, 2020). Needless to say, this meant all of the approaches in this time period were determined entirely on the basis of "brown" needs. And the Balkhu-Sanchal case area which was earlier at the back of most of the narrative, was

suddenly in the forefront of it. But alas, only because of its proximity to high value road and transportation hubs. With these majorly utilitarian developments occurring around Balkhu-Sanchal, it lagged behind in terms of well-rounded progress.

But why was only such kind of development at the forefront? It was because the shiny backdrops of towers against heavy highways had become popular "image" of the modern city in mass media. Due to rapid globalization, most South Asians including Nepalese started getting completely fascinated by such images being portrayed of the "western" world in popular media, may it be television or print. And next thing we know, everyone wanted a taste of such a dazzling lifestyle. This completely transformed the imagery and perception of people all over the globe, and Nepal was no different. Ever since the arrival of media forms, they have had humongous influence towards defining human desires and behaviors (Smolenska, 2009). This manipulated and is still manipulating the unwitting minds of people, who simply want to recreate what they see not thinking about the true contextual implications. No wonder today Kathmandu's historical centers have started seeing glass-glazed reflective buildings in its midst - reflecting back an image of heritages tarnished by entangled electric wires. The humble nature of the brown brick and wood was not appealing to people anymore, especially in front of the glittering metal, glass and versatile cement, concrete. The old was considered ordinary, and the new was considered grand, a status symbol. This allowed a sense of neglect and ultimately destruction of the valuable historic architype, whose charm can never be replaced (Lipp, 2009). The process of degeneration simply continued and newer settlements had no trace of traditional dwellings (K.C, 2020). Balkhu-Sanchal falls under this very category with the dominance of cement construction.

While there was a beginning of housing boom in the local level of Balkhu-Sanchal, some "green" agendas were trying to be promoted in the national level. While the degree of their contribution and success cannot be analyzed, their mere introduction

shone light towards a slightly more positive direction. Some of the notable movements that came up were (NTNC, 2009).

5.3 Period 2 (1980- 2000 AD): The case of the Balkhu-Sanchal riverscape

This section will cover a span of 20 years (1980 to 2000) and describe the period that includes the early years of the researcher's family's stay in the Balkhu- Sanchal riverscape.[5] It is heavily based on the memories as recalled by the early residents of Balkhu-Sanchal. Memory is not the same as the recorded history of a place (which in fact Balkhu-Sanchal largely lacks). It hence adds a layer to the narration, revealing what event/feature stood out enough for people to remember it and retell it. It stands out for its reach into minute details that a historians would have overseen for its irrelevance to the bigger picture. Hence "memory is a complex phenomenon that reaches far beyond a historians archives" (Bjonness, 2009, pp. 273), and it ought to be utilized especially in a study under the UEP approach.

5.3.1 1980s

By the early 1980s, the mega construction projects of the ring road and the Kuleshwor housing had finally connected Balkhu-Sanchal with the urban whole of the valley. On the macro level of the valley, through all the years of the 1980s there was constant political instability. And this enabled a much stronger migratory push from rural regions into urban cores of the valley. More settlements than ever before were emerging as a result of the increasing unavailability and unaffordability of land in the

[5] This was also a period with a dramatic changing political landscape from one party panchayat system to multiparty democracy from 1990. From 1996 started a political struggle with civil war. Definitely the multiparty democracy mobilized local democracy and urban municipalities with wards with local developmental responsibilities. But resource disbursements were limited.

core city. So, new migrants were now choosing to locate themselves in the “toles” (neighborhoods) at the edges of the urban form- thus being nearer to the ring road and such as Balkhu-Sanchal. Some old valley inhabitants were also choosing to slowly spread out and resettle in such outskirts where land developments mainly were ad hoc dependent on established land boundaries and existing road accesses. The land developments were initially not infrastructure led, mainly dependent on individual efforts to get water and electricity connections.

“The central Kathmandu was becoming more and more congested due to urban activities, and it was not appealing to me anymore! I remember I was looking forward to start a new life with my family in a calmer location, away from the disturbances of the core.” says Mr. Manish Lal Shrestha (see Annex-2 for complete interviewee list) explaining why in 1983 he chose to build a new house in Sanchal instead of continuing to live in his ancestral locality in core Kathmandu. As for Mr. Anup Baral, he had lived in the city core of Kathmandu for 55 years, but some 37 years from today he decided to re-locate to Sanchal. His main motivation was his desire to live closer to relatives who had already moved into the adjacent areas. This statement exhibits that the vicinities of Sanchal and Balkhu were slowly gaining popularity for new residential constructions during this period when land values still were at an affordable level for a mid-income, established urban citizen.

Both Mr. Manish Lal Shrestha and Mr. Anup Baral re-account the time when their family houses were being constructed, and there were barely two more houses next to them and no proper roads, just some access paths. But with the rising popularity of such areas for settlement, more families followed suit and joined the list of Balkhu and Sanchal residents.

5.3.2 1990 AD

In a few years built-ups started spreading but had not completely overtaken Balkhu-Sanchal yet. And thus, the area's old identity defined by the agriculture fields had not completely died out. There were still many agricultural plots that continued thriving, maybe even more than before. This was because with decreasing cultivable land, the families- mostly "Jyapu"s (Newar community affluent in farming) that owned such lands were paying more attention to what was left. Moreover, with houses popping up right next to them, their daily business had increased.

> "There was a huge agricultural field right in front of our house back then (Fig. 5-8). It was owned by a Jyapu family who lived in the corner of the field in a humble brick and mud house. We knew their whole family, and they used to work together in the fields every day. The greenery it provided was quite a lovely sight to see."

Says Mrs. Renu Shrestha when asked to describe the early years of her life in Sanchal. The fields not only added natural aesthetics, but also was a huge bonus in terms of convenience for families like the Shresthas. Every day the nearby residents had easy and quick access to fresh vegetables bought at a very reasonable price. Hence, a simple and harmonious communal system was organically established. Mrs. Sarojini Bajracharya, also a resident of Sanchal expresses similar appreciation for the old system, as the convenience as well as the quality has decreased in todays' age. If we look at figure no. 5-9, we see a satellite image of the case as in 2020. The agricultural field being discussed above covered the whole area marked by the green box. The same figure no. 5-9 clearly shows the current state- where it has been replaced completely by built-up.

Figure 5-8 Green field in front of the Shrestha house in 1990 (author's family photo collection)

Figure 5-9 Green rectangle on the 2020 satellite image marks the prior location of the green fields

As for the Bagmati river, it was thriving with massive water volume easily reaching the level of the banks. The Balkhu-Sanchal section was gladly away from the chaos of the core of the valley. As seen on the image below (Fig . 5-10), while we can see some built up across the river on the Balkhu side (KMC, ward no 14), they are also interjected with ample greenery and heavy trees. As for the riverbanks, both the sides are completely clear of disturbances and have an unhindered plain look. Being assumably a public land, houses were not allowed to be built here and there was good control over urbanization and new built developments. It can be noticed that there is no built-up next to Shrestha family's house as well, making it appear as if the distance between the house and the river is much shorter than the reality. The riverscape overall looks extremely calm and inviting and has a very rural charm to it. The picture also tells the story of use of the river shore for an important annual social event in October - November of 'Dashain tika´, where the elders bless the younger ones.

Figure 5-10 View of the river and Balkhu, as seen from the terrace of Shrestha house (author's family photo collection)

The same could not be said for the central sections of the river. The environmental problems had risen so much that talks of its conservation was finally in motion. As a result, the "1990 Save the Bagmati" campaign was launched by Mr. Huta Ram Vaidya. He referred to the Kathmandu Valley as the "Bagmati Civilization" and this term became popular in describing the intricate relationship between the city and the river (Shakya, 2011). He actively promoted his cause for a need for intervention and generated added interest and participation from citizens in the future. His efforts have not gone to waste, as even today his endeavors are being continued by many more activists in various ways.

5.3.3 1992 AD

The photograph below (Fig. 5-11) was clicked from almost the same terrace location (quite fortunately) as of the one from 1990 (Fig. 5-10). This gave a good chance for comparison. Two years down the line, and we can definitely see a difference in the natural outlook of the riverscape. While the built-up cannot be pointed out to have distinctively increased, there is obvious indication of increased natural vegetation on the riverbank. Ecologically speaking, this is a positive sign of unhampered growth. But at the same time, it also signals the lack of maintenance from the authorities, and possibly land transfer or sale. This often results that cultivation stops, and the land is kept fallow. If this were still a rural area, the unkempt nature of the greens would not have been an issue at all. But at this point in time with human settlers growing, it was important for the overall environmental future to create a system of maintenance and land use regulation so as to prevent exploitation of any kind. This was obviously left unrealized and unregulated.

Figure 5-11 View of Balkhu and the river as seen from Shrestha house terrace in 1992 (author's family photo collection)

As for the river, it still displays a healthy flow though slight discoloration of the water can be noticed. Overall, the natural image of the riverscape was not too far gone, with residents sharing tales of foxes-howling through the evening and night.

> "The water was clear enough to bathe in, and I vividly remember seeing some fishes in the water through these early years."

exclaimed Mr. Brajesh Adhikari, proving that the ecological balance had not tipped off and an aquatic ecosystem existed – which is far from what we can say today.

Mr. Anup Baral added that unlike the pathetic current state, early on the enticing river welcomed several religious devotees - coming up to either take a holy dip or, offer prayers and flowers into the water for various daily as well as special rituals. People including himself would directly collect the holy water from the Balkhu-Sanchal riverscape in small containers for customary religious use. And today, the sad reality is, all we would collect is sewage!

5.3.4 1994 AD

The rate of urbanization was steadily increasing and finally picking up quite the speed in Balkhu-Sanchal as well. The image below (Fig. 5-12) is from 1994 (same position from the Shrestha house terrace) and it evidently shows the jump in built-up density from 1992 to 1994 on the Balkhu side of the Bagmati river. The previous backdrop of the riverscape was balanced with houses as well as trees. But the 1994 backdrop seems to have been quite overwhelmed by the growth of multi-story buildings. The only greens remaining were on the riverbanks which had thankfully not been encroached by construction yet. A similar growth pattern was being noticed by all of the residents on the Sanchal side of the river as well (though unfortunately not captured on photograph).

This is not a shock as by this time the riverscape had developed rudimentary road axes running alongside the Bagmati river. Meaning the already popular and busy ring road was even more facilitated, inviting more vehicular movement than ever. The impact can be seen in the difference in the quality between the photograph of 1992 and 1994. In 1992 the air quality seems to be much better thus allowing beautiful views of the hills to fit in the frame. Whereas just 2 years later in 1994, the cloudy atmosphere has eaten up the hills leaving unaesthetic dusty buildings to dictate the frame. This can be logically linked to the overall spike of automobiles around the valley, and also very much in Balkhu-Sanchal.

Figure. 5-12 1994 photograph from Shrestha family's terrace, overlooking the Bagmati river and Balkhu (author's family photo collection)

While urban growth was occurring on both Balkhu and Sanchal sides, a difference in typology was noticed. Since the Balkhu side was located much nearer to older settlements like Kalimati, it was also in close proximity with the commercial area that had flourished though Kalimati and Kuleshwor ´toles´ (neighborhoods). The same commercial characteristics had influenced the Balkhu tole, which is why the buildings

here came to be compact and high rise that housed a mix of dwellings, shops, and offices. Due to lack of personal lawn spaces, compact area and temporary nature, the costs were comparatively lower on these mixed land use typologies. Meaning mostly newly migrated families or individuals were drawn to this area. It was an easily accessible and facilitated area suitable for feasible living.

As for the Sanchal side, it was an outcome of the relatively newer Sanepa and Jawalakhel settlements, so not much commercialization had come up except for a few corner shops here and there. Hence the area's imageability was associated with comparatively more permanent family dwellings, with personal lawn spaces, larger spread out built ups and smaller heights. It was a mixed community, but the average structure of the families and houses denoted that they were fairly economically established in the valley, unlike fresh migrants.

Overall, the case study area was becoming its own place, with a thriving community. As a tradition, Hindu Nepalese have the culture of establishing at least one "Ganesh sthan" (big or small temple dedicated to Lord Ganesh, commonly accompanied by other deities as well) in the walking distance of their homes. This is done for a sense of spiritual protection as well as to provide easy access to the deities for any daily prayers or special customs. Mrs. Renu Shrestha described what the locality or "tole" looked like then:

> "In olden days, a collection of 10 -15 families would have one "Ganesh sthan" allocated to them. But with rising density, more families share the same local "Ganesh sthan". Following the same tradition, Balkhu- Sanchal also created one which was established since the 1980's and is the nearest cultural point for the locality"

This said Ganesh sthan still exists (Fig. 5-14, marked by yellow dot) and has obvious local value. But unlike other temples / religious locations, it does not attract crowds from outside, as it has not been built in the traditional aesthetic (Fig. 5-13). Instead, it

blends in with the modern cemented look, and also doubles up as the local health-post. While the Ganesh sthan definitely serves its local purpose, its lack of visual cultural characteristics takes away scope for future possibilities.

Figure 5-13 Cemented Ganesh Sthan located in Sanchal (Google maps, 2016)

Figure. 5-14 Location of Ganesh sthan- yellow (adapted from Google Earth by author)

5.3.5 1999 AD

On the global front, the Brundtland Commission had made big waves by bringing forth a discussion over "sustainable development" in 1987. While it took some time for Nepal to get on the bandwagon, once on it, the government started introducing new policies in an attempt to encourage policies that benefit both "brown" and "green" needs of the Valley, such as:

- Natural Resources Act (1992)
- Industrial Enterprises Act (1993)
- Environment Protection Act (1996)
- Water Resources Act (1993)

- National Sanitation Policy (1994)
- National Shelter Policy (1996)
- Town Development Act (1998)
- Local Self-Governance Act (1999)
- DEWATS (1997) – pilot project: constructed wetlands for wastewater treatment.

Once again, the degree of their success cannot be easily analyzed and evaluated, but the effort set in motion a much-needed change in the mind set and perception of people. Anthropocentricism had defined the last century with a focus on a sectorized brown agenda, and it was high time for biocentrism, with its green agenda, to at least lay its foundation.

5.4 Period 3: 2000- 2021 (current) AD: The case of the Balkhu-Sanchal riverscape

5.4.1 2003 vs. 2004 AD

The very first Google earth satellite image available of Balkhu-Sanchal dates back to 2003 (Fig. 5-15). As per the 2003 imaging, while there is obvious residential development along the inner roads of Sanchal, many green agricultural fields have seemed to survive possibly due to lack of direct road connections[6]. There is almost no built up in the plots right next to the Sanchal riverbank, and a row of trees can be spotted (marked by green rectangle on Fig. 5-15). While these trees might look like mere

[6] The lack of access roads, and prime infrastructure like fresh water and electricity connection evidently slows urbanization and built up urban sprawl. However, it is more complex. Early colored satellite photos indicated that large parts of arable land resources in the Kathmandu Valley were not cultivated. First, investment in land is considered in Nepal as safe. Second, acts in the interest of the tenant farmers, make new urban based landowners hesitant to involve in cultivating the land.

specks on the image, from the actual ground perspective, these were rather tall trees that had strong visual as well as ecological appeal. The area marked by the yellow box was previously a large green field, but in 2003 the extent of it has been reduced to maybe 25% of the original as seen below.

Figure 5-15 Case study area in 2003 (adapted by author from Google Earth, 2021)

Figure 5-16 Case study area in 2004 (adapted by author from Google Earth, 2021)

The most monumental change in 2004, is the absence of the tree row on the Sanchal side of the river (visible in 2003) that were a huge part of the Balkhu-Sanchal riverscape.

"It was quite disappointing to see such magnificent trees begin cut down, and it really changed the image of the area -degrading it even more. Earlier,

> the trees would attract a lot of visible bird activities that would brighten up the scene. But even that was clutched away",

recalled Mrs. Neha Shrestha from her school days. As for what had not quite changed from 2003 to 2004 was the general status of the river. Both years show a wide passage of water coming down from the upper half before narrowing and twisting down through under the Balkhu bridge. Despite the declining water quality, the flow was sturdy enough to be audible, as young residents share from their memories. Similarly, the Balkhu riverbank seems to have not changed much either, with both years showing mostly clear patches of land.

5.4.2 2006 AD

2006 brought drastic political upheavals, that jeopardized the already delicate urban fabric of the Valley (K.C, 2020). Hence once again a chain of migration from insecure rural areas to the Kathmandu valley was set loose. The urban sprawl expanded to a point that nothing besides the river was dividing the originally distinct cities of Kathmandu and Lalitpur. Administratively they were different but in reality, the mechanism of the two cities had blended into one (Tiwari, 1999). Balkhu-Sanchal being located right at the junction of KMC and LMC, was definitely suffering through the repercussions. "Brown" demands were skyrocketing, encouraging authorities' inclination towards construction of utilities – may it be water supply, roads, electricity, or sewage lines. While from one perspective, this was an attempt to fulfill basic needs and services, it was discernible that it was half baked and disastrously inefficient. These proved the incompetence of the authorities to deliver.

As an after effect of the "brown" projects, it was seen that more and more people were seeing a scope in real estate and land investments (Thapa and Murayama, 2009). No wonder there was a striking annual spike of 8.5% seen in the Valley's overall building

construction, meaning cultivable lands were being replaced and brought down by 8.6% to 44% (Shrestha, 2015). A similar proportion of transformation is seen being reflected on the satellite imaging from 2006 (Fig. 5-17). Several of the green spaces visible till 004 have been engulfed by built-up.

Figure 5-17 Case study area in 2006 (adapted by author from Google Earth, 2021)

- **Balkhu dumping site:**

These "brown" projects had by now pushed "green" agendas to the very back of the discussion. Problems spiraled up to new heights when the government shifted the dumping sites to the Balkhu-Sanchal riverscape (later officially to "Sisdol") (Mahaseth, 2016). This was an unexpected ramification of the court win of Pro Public back in 2000. While the order was for the government to ensure proper waste disposal and management, their efforts looked superficial – only done to silence the uproar. The concerned authorities simply made Balkhu-Sanchal an easy target, as it was located in the symbolic "edge" of the cities – and away from immediate media attention. The dumping culture generated in that year was clearly photographed in the satellite image below (Fig. 5-17), where the waste disposal has encroached into the river basin and hampered the already weakening water flow (marked by red rectangle on Fig. 5-17).

- **Emergence of squatters:**

The concept of squatters did not really exist in the Rana period because of how tightly controlled everything was. The very small number of people who came into the valley then would simply stay in traditional guest houses until their purpose was fulfilled. But with the changes in the political ecology, and peaking migration charts, immigrants started staying for longer periods of time. Hence, they were opting for rented accommodations within the valley as they could not afford permanent houses yet. Slowly the situation got out of control, that nothing was left for the poorest of the urban migrant renters and local marginalized and poorest. Having been left helpless, these vulnerable groups started residing in make-shift informal houses (Mahaseth, 2016). Such houses were being built by encroaching into empty unregistered ("Ailani") lands. While unauthorized, these houses (later settlements) were not contested early enough by authorities due to the ongoing political turmoil's distractions (Shukla, 2015). Hence forth

they became their own entity and were identified as squatter settlements or "Sukumbasi basti". While such settlements had risen in other central city areas in previous years itself, the Balkhu riverbank saw their first traces in 2006 (marked by red circles on Fig. 5-17).

5.4.3 2007 AD

Figure 5-18 View from Shrestha family's terrace in 2007 (author's family photo collection)

The above photograph from 2007 (taken during playful celebration of a Hindu festival "Holi") looks out to the Balkhu bridge and Bagmati river. Once again taken from the Sanchal side, two stark aspects can be noticed within it:

- **The degraded state of the Bagmati river:**

While many of the early years Balkhu-Sanchal enjoyed a comparatively healthy natural environment due to its "outskirt" location, it did not take too many years for the situation to flip. A hydrological study undertaken in 2007 exhibited the worrying state of the various sections of Bagmati including Balkhu-Sanchal (KAPRIMO, 2007). As you can see in Table. 5-2 below, various biological indicators were measured in the water

sample collected at 10 sections of the river (listing as per the order of flow from the northern source through the city core). For easy understanding, the first section- "Sundarijal" is at the foothills, nearer to the origin and hence less affected by human activities. It being the least likely to be polluted, its numbers can be used as a baseline for comparison.

Table 5-2 Different biological parameter study at varying sections of Bagmati river (KAPRIMO, 2007)

Sampling Site	Parameters					
	Dissolved Oxygen (mg/litre)	Oxygen Saturation (%)	BOD (mg/litre)	COD (mg/litre)	Faecal Coliform (MPN)	PH
Sundarijal	8.38	96.1	2	20.2	7	7.62
Gokarna	8.51	103.8	4.5	23.5	--	7.15
Gaurighat/Gujeswori	7.56	93	5.5	28	5×10)2	7.06
Tilganga	4.2	43	35	134.4	5.4×10)6	7.19
Sankhamul Dovan	2.25	28.5	120	268.8	2.2×10)6	7.24
Sankhamul Ghat	2.55	31.5	35	179.2	--	7.26
Thapathali	2.15	27.5	117.5	694.4	2.2×10)6	7.18
Teku Dovan	1.85	20.5	80	280	1.1×10)6	7.25
Balkhu	2.45	30.5	97.5	224	--	7.23
Chovar	5.95	75	42.5	112	1.1×10)6	7.31

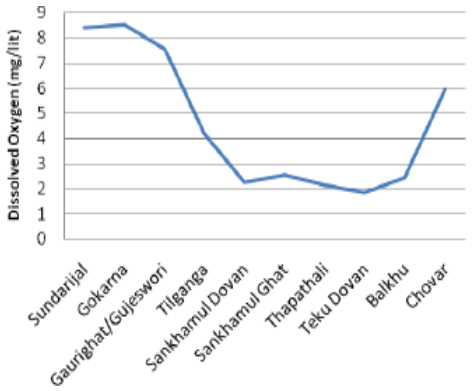


Figure 5-19 DO (mb/lit) at different sites (KAPRIMO, 2007)

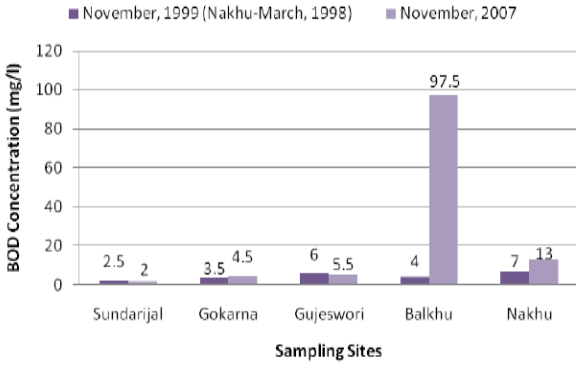


Figure 5-20 BOD at different sites along the river (KAPRIMO, 2007)

The easiest way to judge the health of the river is by checking if it has Dissolved Oxygen (DO) higher than 5mg/lit, and Biological Oxygen Demand lower than 10 mg/lit (for agriculture, 6mg/lit for bathing and 4mg/lit for drinking and aquatic life)

(Dahal, Khanal, Ale, 2011). And it is disheartening to see that Balkhu-Sanchal's statistics are unacceptable at all fronts. The difference made by proximity to human settlement is clear-cut from figure. 5-19 and 5-20 above, as it shows the Dissolved Oxygen taking a dive throughout the city areas, and right after Balkhu-Sanchal (which is an edge for both KMC and LMC), the water quality improves again (Fig. 5-19). As for the trend of BOD differing 1999 vs 2007, it is interesting to see that there are even cases of improvements for some sections like "Sundari-jal" and "Guheswari" (Fig. 5-20).

Some logical linkages can be made as to how such small, yet laudable rejuvenation was possible. Looking at Guheswari, it could be credited to the 2002 launched wastewater treatment plant. Time and again experts and academics like Dr. Manoj Pandey have highlighted on the lack of efficiency of the plant – "It hardly removes 40% of the organic matter". Having done a detailed PhD study on the feasibility of constructed wetland systems to supplement the existing conventional wastewater treatment systems (Pandey, 2015), he explains how the combination of natural and conventional systems can elevate the efficiency greatly. And surely if an inefficient system can produce minor positive results, there is a huge potential for further plant development and efficiency to be capitalized on.

As for Sundari-jal, over the past few years up until 2007, a sense of sustainability and importance of river conservation had definitely arisen. This had led to various organizations/ communities stepping up to generate spotlight demanding mass civic participation in river cleanups. Such efforts began from the culturally significant section at Sundari-jal, where a buffer from urban activities was created (Dahal, Khanal, Ale, 2011). Another feat was the creation of the "Bagmati river festival" (BRF), a platform for people from all walks of life to come together for a "green" solution. It was initially launched in 2001 by an NGO called Nepal River Conservation Trust (NRCT). It created quite the buzz by using recreational events to attract the participation of individuals,

communities, and organizations. The idea was to establish it as an annual cultural event, that could partially recreate the fanfare and dedication enjoyed by traditional main festivals (like "Indrajatra", "Holi" etc.). The strategy was to maximize on the age-old technique of using festivals as a way of reforming behavioral attitudes, culture, and perception, for the better (Dahal, Khanal, Ale, 2011). While it is a worthy concept spawning impressive participation and investments, it is also important to note that such events have not given Balkhu-Sanchal the chance to enjoy the much-deserved benefits yet. As figure. 5-21 unveils, the focus always stopped at Teku Dovan. Undoubtedly there are several opportunities that can be explored to fix this in the future.

	Events	Site	Major co-organizers and participants	Remarks
1	Clean-up campaigns	Pashupati, Shovabhagawati, Tilganga area, Thapathali, Kupondole, Teku, Chovar…	Partner I/NGOs, community organizations, clubs, Aama Samuha, media, corporate houses, schools and universities, student societies…	Since 2001
2	Heritage Walk (Xpact & General)	Teku-Thapathali…	Locals, Expatriates, students, media, I/NGO representatives…	Since 2004
3	School art, essay and poetry competitions, stage drama, amateur photography,	Schools and the closing venue, usually Thapathali	School children	Since 2001
4	Plantation	Kupondole, Thapathali…	Students, media, I/NGO representatives, corporate houses, local clubs, aama samuha…	Since 2001
5	Hike for Bagmati	Chobhar-Shankhamul	Partner clubs, schools and universities, student societies…	Since 2008
6	Waste management training (mainly composting)	Teku, Thapathali…	Locals, clubs, aama samuha and partner NGOs	Since 2004
7	Cycle rallies for women and men	SVS	Partner I/NGOs, clubs, corporate houses, universities…	Since 2004
8	Technical workshop on Bagmati River	NTB hall	students, media, I/NGO representatives, universities, student societies…	Since 2004
9	Bagmati Kayak Clinic	Taudaha	School children and interested others	Since 2001
10	Dunda Daud School Challenge	Sundarijal-Jorpati, Tilganga-Thapathali… SVS	School students	2007
11	Down River Kayak Race	Sundarijal-Jorpati, Tilganga-Thapathali… SVS	NARA, HRGAN and partner corporate houses	Since 2001
12	Bagmati Live Aid	Teku, Shankhamul	Partner I/NGOs, community organizations, clubs, Aama Samuha, media, corporate houses, schools and universities, student societies, musical bands, ministry	2007
13	Nature Hike	SVS	Different societies and clubs, expatriates, students, media, music professionals, I/NGO, representatives, universities, student societies…	Since 2006
14	Bird Watching	Sundarijal, …SVS	Partner I/NGOs, different societies and clubs, expatriates, students, media, music professionals, representatives, universities, student societies…	Since 2004

Figure 5-21 Various initiatives taken as part of the BRF (Dahal, Khanal, Ale, 2011).

- **The degraded state of the Bagmati river:**

Looking back (Fig. 5-18), there is one more thing noticeable besides the degraded river- there seems to be a new land use typology on the rise. The green agricultural fields seen in 1990 is definitely out of the scenario, and instead we see tall stacks of bricks and temporary shed like structures adjacent to the ring road. As pointed out by all residents, these were automobile garages and construction material storages, and the photographed were not the only of its kind to appear in Balkhu-Sanchal.

> "The Balkhu bridge's excellent connectivity to the Kalanki, Tribhuvan university (oldest public university of Nepal located in Kirtipur),and the Dakshinkali temple had made the area highly activated with vehicular movement" explains Mr. Manish Lal Shrestha.
>
> "Balkhu and Kalanki are major hubs for 'sumo' drivers (Sumo is a Toyota brand of 4-wheeler that is popularly commercialized in Nepal for road travels). They start from here, and then drive all over the country. So, this has brought in a lot of congestion here, there are heavy vehicles parked very randomly despite government's claims of organization."

stated Mr. Anup Baral while his daughter Dr. Niva Baral joined the discussion saying –

> "Not only Sumos, but even heavy and polluting trucks bringing in crop produces, construction materials etc. from outside the valley have dominated the landscape. Seeing their adverse effects, the authorities brought in daytime bans on entry of such vehicles into the ring road. Ironically, this move I think went horribly wrong for our area!".

She was referring to the increased growth of automobile dedicated land-use that was instigated. Because of the timing bans, the businessmen wanted to efficiently locate their warehouse/shop/storage/servicing facilities as near to the valley entry point as possible. And the empty plots along the Balkhu-Sanchal riverscape were like golden eggs for them. Hence commercialization of a specific typology was in full swing, mostly- petrol pumps, hardware shops, automobile repair shops, construction material warehouses,

storage facilities, spare-parts shop, 'kabaadi' or scrap collection etc. The situation only escalated through the years due to a "scale effect". This phenomenon of congregation of trades can be observed in other city locations as well, for example dominance of – handicrafts and tourist catering enterprises in "Thamel", cloth shops in "New-road" and eateries in "Jhamsikhel". Interestingly a similar concept was promoted in the ancient Malla era, where the rulers wanted to create pockets of homogenous professions/industry within their towns (Tiwari, 1999). But it is crucial to differentiate the context of then vs. now. While ancient Kathmandu was compact enough to benefit the customers with good accessibility, the "scale effect" of modern Kathmandu needs to promote a more mixed-use and sustainable development. While the typology seen in Balkhu-Sanchal also has its own value for a well-functioning society, the accumulation of many in the same area has piled on pollution and disturbances of all kinds.

Ms. Asmita Bajracharya, a young journalist was quick to express how the coin had 2 sides –

> "the development of the roads has benefitted the people living in the area to a certain extent, but in more ways, these movements have also affected the river's ecosystem, increased pollution and taken from Bagmati its own space and life. The river no longer looks healthy and there are not many today who will spend time by the riverside with the way Bagmati looks at present.".

The brunt is endured not only by the Bagmati river but also the residents and local business owners. In the name of raising standard of one sided type of "brown" agenda, the wholistic development of the community was left neglected. Even today, the case study area lacks many proper facilities (besides the above mentioned). Because of the haphazard state, despite its "urban" identity, Ms. Rupa Sharma casually refers to her Balkhu-Sanchal locality as a "Gau" (meaning village). Needless to say, it is time to recognize that an urban city has more "brown" needs than just roads and vehicles!

5.4.4 2009 AD

- **Transformations on the Balkhu side of the case study area in 2009:**

The satellite image of 2009 shows a monumental transformation on the sandy Balkhu riverbank from 2007. As you can see in the image below (Fig. 5-22), the smalls specks of squatter houses that had emerged in 2006, had morphed into a full-fledged settlement (marked by red outlined rectangle)! The rapid densification is quite attention worthy, and probably unanticipated by the authorities. The google earth database does not have an image for 2008, but we can safely assume that the spread must have started multiplying evenly through 2008 and then ended up with the state in 2009, accounting for 300 households (NEST, 2010). Up until this point, approximately such 60 informal settlements had already been recorded in the Valley by an NGO called "Lumanti-support group for shelter" (Shukla, 2015). So, the emergence of the Balkhu settlement was not much of a shock, but still a strong reminder of Devas's 1993 claim around new realism in city planning (Hamdi and Reinhard, 1997). He had asserted that there will always be limitations to how much a governing body can actually control of a growing and populous urban system. And that it was inevitable that most of the morphology will be dependent on individual/community behavior and perceptions instead of government planning. The urban poor are already facing major hurdles like lack of essential services, shelter security etc. But the wicked problem of shelter for the urban poor seems to be bound to increase. The Nepalese government, with all sincere policy intentions of post-earthquake shelter security (Ghimire, 2019), is in debt and constantly undergoing structural political uncertainty. The rural - urban labor migration is unstoppable, and local marginalization and the earthquake disaster of 2015 have added to the problem (Hamdi and Reinhard, 1997).

This settlement consisted of a mix of migrants from the hills ('Pahadi's) and Terai ('Madhesi's), who came from backgrounds of varying socio-cultural, economic,

religious, and political scenario. Many were victims of either the Maoist insurgency or a natural disaster, leading them to find the Balkhu riverscape to squat (Rumba, 2014)

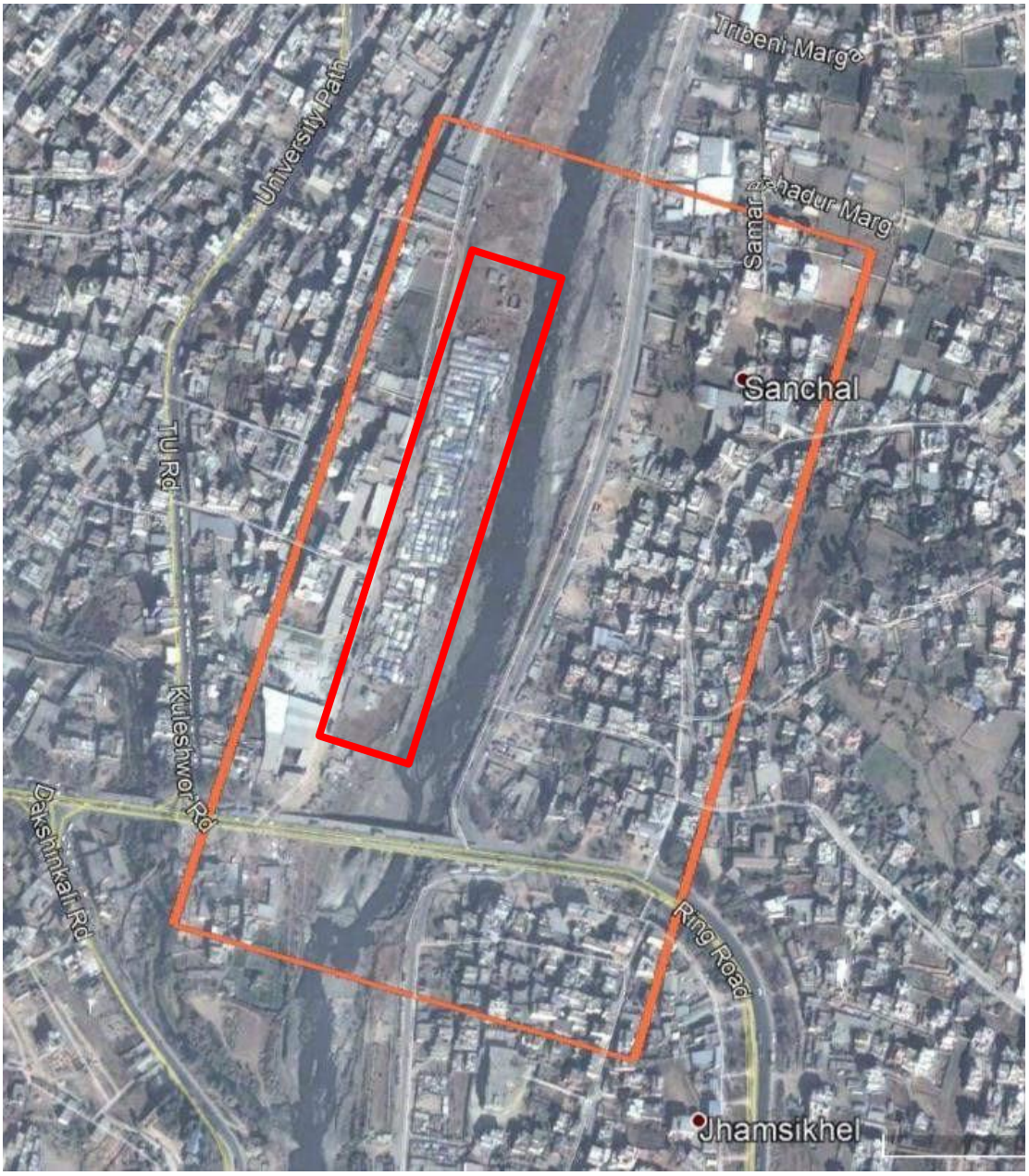


Figure 5-22 Case study area in 2009, Balkhu transformation (adapted by author from Google Earth, 2021)

To tackle this up-and-coming issue, the Department of Urban Development and Building Construction (DUDBC) realized that they first need to understand the overall and settlement specific situations. Hence in 2010, with a help of a private consultancy – 'NEST' they mapped out 5 of the Bagmati squatter settlements including the one in our Balkhu area. Some key findings from their report are as follows (NEST, 2010):

- The houses were laid in a row and totaled 300 households.
- Majority of the houses were single-storied except few double storied.
- A variety of main construction material was noticed - 32% plastic sheets, 19% bamboo, 6% brick/concrete blocks + mud mortar, 16% tin sheet, 10% ply board, 16% brick/cement block + cement mortar. (Seen in Fig. 5-23, 24, 25)
- The manpower type was mainly unskilled. 63% of the residents depended on waged employment, 16% on minor local business outlets, and the remaining 21% did not have a secure source of income.
- The access roads were only 1m wide and unpaved.
- Water supply and electricity is available but used in a shared manner.
- 86% of the households use the communal toilets, and the remaining have their private toilets. But all of the drainage is directly discharged or emptied into the river.

Figure 5-23 View from the Balkhu side into the squatter settlement (NEST, 2010)

Figure 5-24 Housing materials of squatter settlement (NEST, 2010)

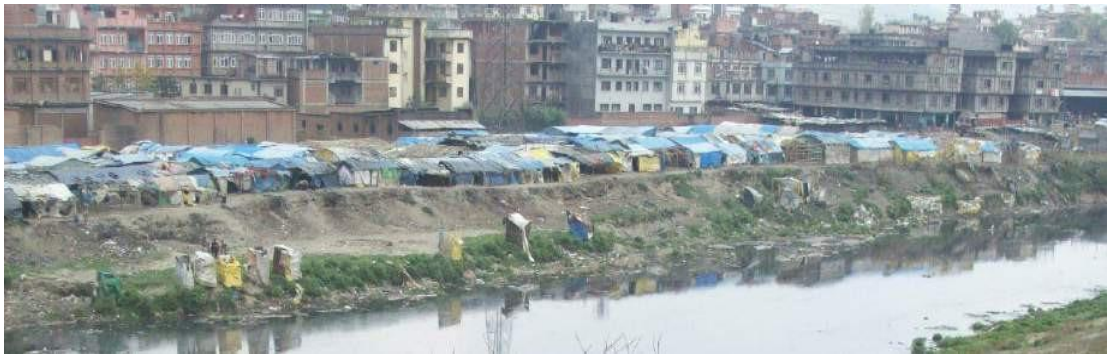


Figure 5-25 View of squatter settlement as seen from Sanchal side 2010 (provided by Dr. Niva Baral)

The results show the vulnerable state of the squatter's physical living environment and their limited access to improved livelihood conditions. In addition, they also constantly struggle with the sense of belonging in the bigger community. A negative prejudice has been formed against the squatters, as they are seen as illegal captors of land and polluters of the river.

> "It is such a huge concern for everyone because we can see from our terraces itself that the squatters do all their washing, bathing, and dumping directly into the river!"

told Mr. Brajesh Adhikari, expressing understandable frustration. After further discussion he showcased the mixed-emotions many of the residents have by concluding:

> "it is a pretty conflicting topic. It's certainly something that the government should manage; however, the people in squatter area have their own problems and difficulties--we cannot overlook the fact that they too have their reasons for staying in the area."

> "Every monsoon the river swells up, and spills over the riverbanks. But thankfully since our houses are on a slightly higher elevation, it did never reach us. But we could all see the havoc caused by flooding in the squatter settlement. That was quite unfortunate to see, but at the same time the destruction led to an interesting observation- some of the houses that had broken down were exposing its interiors and they were stacked with many modern appliances. As a young girl I remember being confused by that visual – as I could not associate the presence of those appliances with 'poverty'."

described Mrs. Neha Shrestha when asked on the presence of the squatter settlements. Many had similar confused sentiments, and it sparked the need to separate the truly helpless from some of the plain opportunists. But helpless or not, they are prone to the very much known hazard of river flooding as they clearly have breached the 'cadastral river extent' zone in the cadastral map produced by DUDBC (Fig. 5-26). This brings

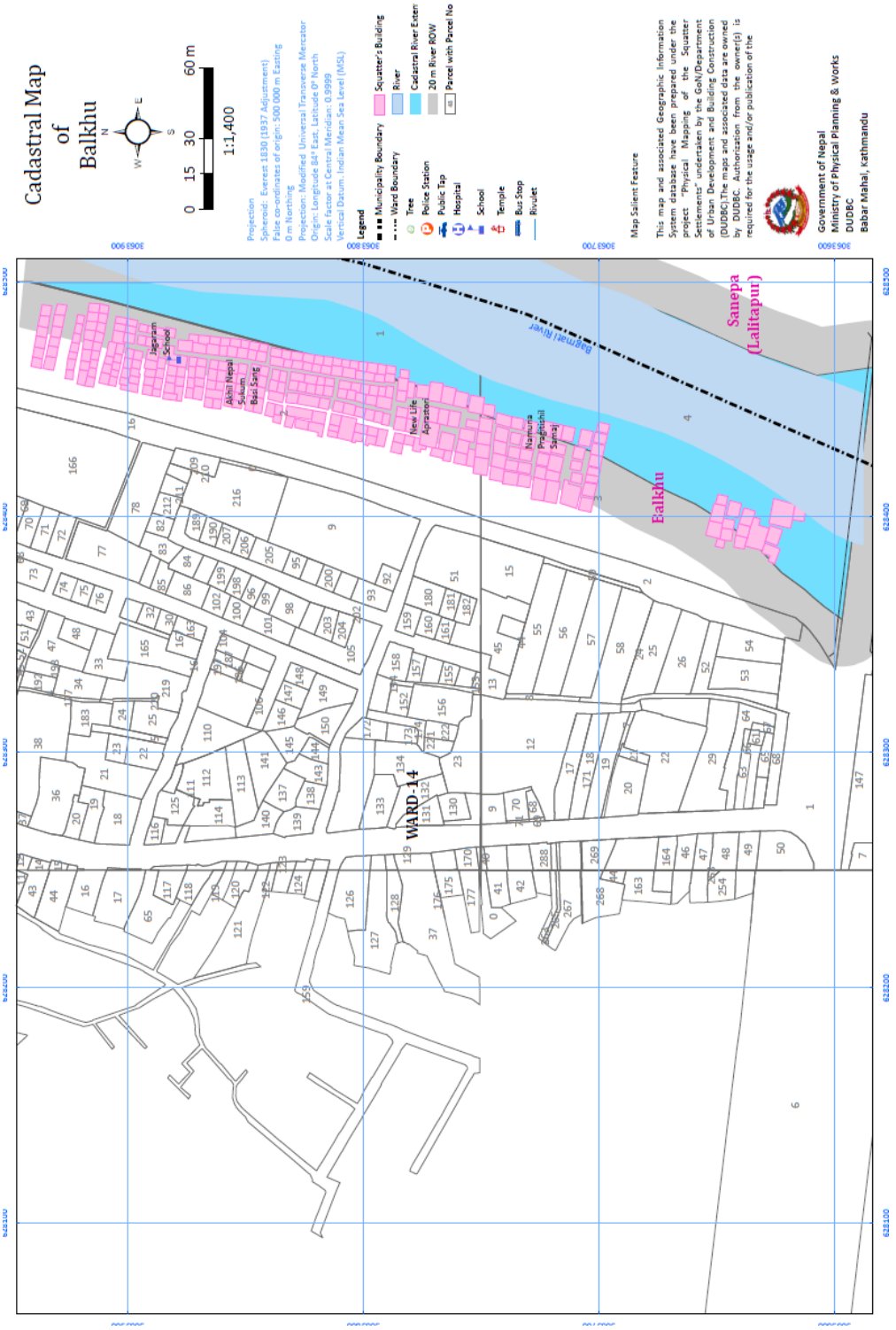


Figure 5-26 Cadastral map of Balkhu (DUDBC, 2010)

forward a question- how much can those ‘some’ be criticized as ‘opportunists’, if their ‘opportunity’ means living in the constant fear of flooding and housing insecurity? Moreover, as per the mandates at least 20 meters of ‘right of way’ (ROW) is supposed to be kept unobstructed beyond the Bagmati ‘river extent’ (to allow for natural floodplains) (Bajracharya, 2020). But that has been completely encroached by the Balkhu squatter settlement, once again as seen in the cadastral map produced by DUDBC (Fig. 5-26). When data like such comes forward, many citizens understandably oppose the squatter settlements further pointing out that the river “rises up seeking revenge on the encroachers” and they brought it upon themselves (Bajracharya, 2020). But it is important to be critical of the average-man serving- Bagmati corridor roads (in whatever state) as well- which continuously fall in and out of the river’s 20 meter ‘right of way’. Hence the squatters cannot be singled out for blame.

More debate was generated when the 2008’s Urban National Policy attempted to presumably help the squatters acquire land legally through payment of certain fees. But only some groups showed up to register themselves as landless (Shukla, 2015). But overall, the efforts from the government were seen as weak. They seemed to simply “tolerate” the squatters but not empathize with them enough to dig deep and create just solutions (Moffat and Finnis, 2005). But such type of new and emerging “fragmented society” (Lipp, 2011) is very much part of the reality, that cannot be ignored.

- **Transformations on the Sanchal side of the case study area in 2009:**

While things were shaken up in the Balkhu side, the Sanchal side was no better condition. Negative effects were being seen of the recently revealed ‘Bagmati Action Plan’ (BAP) - a 5-year plan developed by the National Trust for Nature Conservation (NTNC) dedicated to tackling Bagmati’s:

"Decreased water discharge, decreased terrestrial biodiversity, narrowing and deepening of the water way, degradation of river water quality, decreased aquatic biodiversity, changes in riverside land use, decline in aesthetic value of river surroundings, and deteriorating culture and heritage" (Platman, 2014, pp. 20).

This came after pressure from Pro Public on the government's High-Powered Committee for Integrated Development of Bagmati Civilization (HPCIBC). The same HPCIBC was to be the main enforcing body along with several collaborations (NTNC, 2009). The Bagmati Action Plan (2009) starts with a regional watershed perspective, also considering tributary rivers to Bagmati, but relevant localized and area based action plans have to a limited degree been addressed and should be called for. Mostly this has been considered for heritage areas along the river. The plan was supposedly an outcome of an inclusive stakeholder meeting in 2008 (jointly done by NTNC and Nepal Water Conservation Foundation- NWCF). Through it, it was very clear that the task was not easy, as each stakeholder group had differing priorities and interests. Hence it was made obvious that there was a need to cater to all in a balanced way and not be inclined to one way or other. This also meant that the revival of Bagmati was not a typically "green agenda" as one would assume rudimentarily. It should actually be a good mix of both green and brown. Because without the upliftment of both the other might also suffer directly or indirectly. So, the only way forward is in an integrated fashion. (Platman, 2014).

BAP had divided the river length into 5 zones depending on the level of its degradation, which was directly proportional to the centrality of the location. As seen in figure. 5-27 below, Balkhu- Sanchal (marked by white circle) lies in Zone 4 (red)– the highest polluted urban zone. All zones were the given their own specific goals and plans. Dr. Manoj Pandey commented that this was a good approach on paper, but success could not be materialized as imagined.

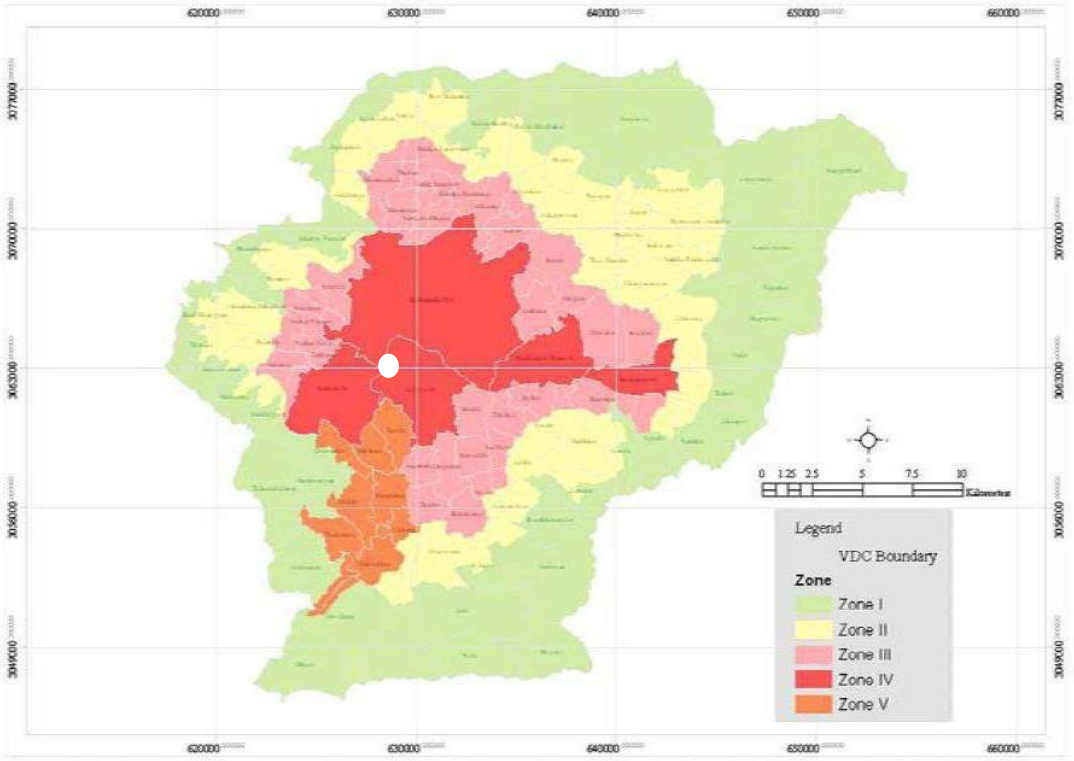


Figure 5-27 Zonal map created as part of the Bagmati Action Plan (NTNC, 2009)

Figure 5-28 Road construction on Sanchal side in 2009 (provided by Dr. Niva Baral)

Figure 5-29 Road construction on Sanchal side in 2009 (provided by Dr. Niva Baral)

On the micro level of Balkhu-Sanchal, the energy of BAP had initiated a Bagmati corridor improvement project on the Sanchal side (as seen in Fig. 5-28/29/30). A road project is nothing new to discuss, but what was interesting in this one was the choice of material. The riverscape had been facing instances of flooding, so the authorities wanted to raise the level of the road. And to do so, they filled the path with layers of garbage,

Figure 5-30 Garbage from encircled dumping ground being used for road layering (provided by Dr. Niva Baral)

drawn from the same pitiful dumping site that had emerged in 2006 (encircled in Fig. 5-29). This project sparked a lot of debate within the Sanchal residents, because while it was agreed that utilizing and minimizing the waste for road construction was a brilliant move – the spreading of the waste through the long stretch invited unbearable stench, house flies, and vultures to the area. These problems had existed also before on the dumping ground site , but earlier it had been better with the garbage concentrated at a specific point. But thinking of the long-term benefits, the residents tolerated many months of the suffering. The image of the area had gone down horribly, but at the same time people were hoping the completion would bring better days.

> "It would have been a successful project had they bothered to keep it maintained over years. But alas, the pitched road could not withstand the years, and the layers of waste was being uncovered again, spilling into the river!"

Dr. Niva Baral shared, explaining how counterproductive projects have been. Moreover, for the construction phase, authorities had emptied the adjacent plots to use for material storage (seen in Fig. 5-28/29/30). This aided the already existing "scale effect" by encouraging similar warehouses to emerge on those plots once road construction was over. Hence the new landscape can be seen on the satellite image of 2009 (Fig. 5-5-31), where the yellow rectangle is the emptying out dumping site, and the purple rectangle exhibits the row of plots used for garages and storage.

Figure 5-31 Case study area in 2009, Sanchal transformations (adapted by author from Google Earth, 2021)

.

5.4.5 2011/2012 AD

- **Transformations on the Balkhu side of the case study area in 2011/12:**

Figure 5-32 Case study area in 2011/12 (adapted by author from Google Earth, 2021)

Through the years 2011 and 2012, the Balkhu squatter settlement had grown by 75 houses, totaling up to 375. This was a considerable 25% growth (marked by red box on Fig. 5-32), leading the whole settlement to cover an area of approximately 821,400 sq.ft. or 8,2 dekar. With the increase in households, the community became a diverse group of almost 1800 residents. This high number meant; each tiny house was sheltering almost 5 people (Rumba, 2014)! The empty land next to their settlement (yellow box, Fig. 5-32) was being used as their dumping ground, which continues till date. This could be a potential ground for basic services for the squatter settlement like health clinic, showers, and WC.

- **Transformations on the Sanchal side of the case study area in 2011/12:**

With the waste dumped on the Sanchal site used for road construction, new life was breathed into the now open space (or an attempt was made to do so). Through 2011 and 2012, the remaining of the waste was used to retain a base (marked by green box in Fig. 5-32) that encroached into the original river basin. Hence the water passage is noticeable narrower. With very less volume of water flowing, the encroachment was not much of an issue at the moment, though it presents possible future risks. The newly vacant land was developed into a green space, decorated with some basic landscaping as clearly seen in the satellite imaging (green box, Fig. 5-32). It was named the Shahid Memorial Park, and the responsibility of its development and maintenance was handed over from government to a local club as per Mr. Manish Lal Shrestha. Overall, it was a good move, but it had not developed completely for it’s success or failure to be analyzed. But a quick google image search allowed access to a few photographs showcasing what had become to the “park” (Fig. 5-33). The sad reality is- it looks more like a junkyard!

Figure 5-33 State of Sanchal; Shahid Memorial Park (Google Maps, 2014)

Its presence is so trivial that many interviewees had no idea about its existence. Once the researcher explained the location, one resident commented that:

> "I don't think a lot of people know about it or have even been to the place. To build functional parks, the development I think also needs to look at developing residential neighborhoods and their connection with the river. Our neighborhood people and the ward representatives have shown no concern of the river in so many years."

Ms. Sneha Adhikari having passed by the said "park" elaborated that-

> "We also have a new Badminton court next to the river, but keep in mind that the houses across the river are mostly workshops and "khaja pasals" (evening lunch shop) that cater to the highway passersby. The residential communities hardly come to this side of the river and the people in the area, who live by the riverside are hardly bothered by such developments because they have their own problems to pay attention to."

So unfortunately, it seems the open space has not been able to transform into a communal park, instead it has simply added to the wasteful image of the Balkhu-

Sanchal riverscape. While it is an exceedingly better alternative than the dumping site, it is unfair for its potential to be wasted in such manner.

5.4.6 2015 AD

- **Balkhu bridge expansion project:**

Figure 5-34 Structural expansion of the Balkhu bridge going on in 2015 (provided by Dr. Niva Baral)

There was a lot of ongoing urban renewal that had been set in motion since 2011 in the valley (K.C, 2020). Part of that urban renewal plan was the expansion of the Balkhu bridge from 2 lanes to 6 lanes (columns for extension seen in Fig. 5-34). This was in continuation of a larger ring road improvement and extension project that was taking the city (by storm) which was welcomed by developers but met with skepticism by land conservationists and also by some planners worried by expansion of urban sprawl valley-wide. The pitched road of 2009 had already turned earthen and was difficult to manage. The road construction made things worse by adding to a lot of dust pollution

that settled down on the river. An added consequence of the bridge expansion was the construction of a proper road connection that went underneath the bridge (Fig. 5-35/36). This can be seen in both negative and positive lights. On one hand it enabled better accessibility for people and ensured the safeguarding of the immediate riverside from built-up encroachment. On the other, it demanded the kind of space that took away opportunities for (future and possibly idealistic) conservational/public lands. Moreover, the never-subsiding atmosphere of 'under construction' was of no appeal.

Figure 5-35 Ongoing path construction in 2015 (Dr. Niva Baral, 2015)

Figure 5-36 New road created underneath the Balkhu bridge (Ray4u, 2015)

- **Sewage pipe network project:**

The last census in 2011 had earlier brought in a lot of new data that deserved the government attention. Since the census occurs only every 10 years, it was quite important to be able to use this fresh data and create developmental plans accordingly. Unfortunately, it was evident that despite a few decades being dedicated fulfilling "brown" agenda, Nepal, and the Valley still greatly lacked proper physicals infrastructure services. All that did hamper the public health and economy of the civil society. And in addition, it increased the direct pollution load on natural resources including Bagmati river. It was revealed that only 46% of Kathmandu households were connected to sewage (Nepal, 2013). Moreover, almost one-third of the national population had no toilet systems. Massive amount of sewage was being dumped into rivers, and more so in the Valley's beloved Bagmati. Only 10% of the wastewater generated was being treated by the plants. With such sad findings, a new act was also introduced in the same year – the solid waste management act. This encouraged public private partnership to curb the challenges at hand, and also regulate acts of pollution through various degrees of normative actions and punishments.

Finally huge plans of installing proper sewage pipes on the entire length of the river was initiated. This was done as part of the Bagmati River Basin Improvement Project (BRBIP), under the High- Powered Committee for Integrated Development of Bagmati Civilization (HPCIDBC). HPCIDBC is the same government funded organization that had formerly taken charge of accomplishing the NTNC formulated Bagmati Action Plan (NTNC, 2009). With towering ambitions, the project set out to finally curb the years of haphazard river sewage disposal, by diverting them through the newly installed sewage pipes. The effects of the same can be seen on figure. 5-37 marked by the yellow rectangle. The river has been divided into section by mounds of earth to make way for the pipeline installation. While everyone was looking forward for an optimistic materialization of the project, the present that it bestowed was not that pleasant. The

whole of the river including Balkhu-Sanchal had become a large construction site, with no natural functioning. The image had become more and more industrial, rather than ecological, especially in combination with the bridge expansion. But all this was being endured with the aspiration that this substantial step would pave the path for a more managed city as well as river system, adhering to both “green” and “brown” goals.

Figure 5-37 Case study area in 2015 (adapted by author from Google Earth, 2021)

- **Save Bagmati Campaign:**

The need to address the cause of Bagmati's revival had obviously reached many by now, including an environmental activist – Mr. Bikesh Shrestha (Annex-2/3). With inspiration from the likes of Mr. Huta Ram Baidya and encouragement from his friends, he had initiated the "Save Bagmati Campaign" some 10 years ago in 2010. His goal was to simply spread awareness and collect volunteers to clean-up the river and its riversides every Saturday. With no official organizational structure, he believed that hierarchy would take away his simple objective: cleaning the river. He wanted to keep it simple, and his impressive efforts attracted voluntary participation of many individuals and organizations including the honorable Nepal Police and Nepal Armed Police Force[7] (as seen in Fig. 5-38).

Figure 5-38 The NPF and APF taking part in the 2015 'Save Bagmati Campaign' under the Balkhu bridge (Save Bagmati Campaign, 2015)

[7] The Nepal Police is the main law enforcing body of the country (Navy blue uniforms), whereas the Armed Police Force (APF) is a 'Para militarized land force' that emerged in 2001 to combat the Maoist insurgency, and continues to act and counter any national armed conflicts. (Wikipedia, 2021)

While the event had begun in 2011, it had not reached the Balkhu-Sanchal riverscape until 2015 (Fig. 5-38/39). Mr. Bikesh Shrestha admits that though it was not intentional to neglect Balkhu-Sanchal, it has become a norm to service the core cultural areas first. This he realizes is due to a wrong mind set, as the river works as a whole system, and all parts of this system are equally important for improved functioning: -

> "Areas like Pasupathi Nath, Teku Dovan are more popular, and maybe more sensational for people to come and join in cleaning. For organizations maybe it is also a way of earning media attention and appreciation, so the programs end up happening more in core areas."

Mrs. Pushpa Dhaubhadel, fellow resident of the area, remembers the day of the clean-up in 2015 – "there was a speaker announcement inviting everyone around and interested to join in the cleaning. Then large number of people started picking up the trash from the river, which was commendable- Especially the fact that they continued despite the difficult terrain created by the sewage pipe installations". While this was a crucial milestone campaign , all interviewees had similar viewpoint that only superficial cleanup will not solve the issue at hand. More locally sustainable and long-term solutions need to put in place.

Figure 5-39 Bagmati cleanup program in 2015 (Save Bagmati Campaign, 2015)

- **Gorkha earthquake in April 2015:**

The 2015 earthquake completely devastated many parts of the Valley. Some urban villages were hit especially hard like ‘Bungamati’. The emergency after the earthquake had put life on hold for all, as everyone was left fearing aftershocks and recovering from the colossal damages. Hence, all Bagmati related projects had been paused indefinitely. This disaster also awakened the value of natural open spaces integrated into the city- as the dense built-up urban structure had proved fatal for many. The perception of human relationships to the environment had changed again, as the fragility of a human habitat in the city was exposed. After a tragic and unpredictable year of aftershocks, citizens had certainly taken a pause to reevaluate their lifestyle and values towards improved resilience. The reconstruction period also showcased substantial communal cooperation and actions for emergency shelters and repairs among the citizens of the Kathmandu valley. The citizens cultural strength contributed to resilience. However, disasters also harm and discriminates especially when it comes to equal rights for the most vulnerable urban citizens, women, and children (Tiwari, Shrestha and Bjønness, 2018). Meaning the already vulnerable in our case study area- the Balkhu squatter settlement was left even more exposed to the harshness of the tragedy.

The local government put several efforts to survey the overall damages but had limited resources to take action. However, with the new Constitution of Nepal of 2015, important issues were addressed by revised building and planning codes. They sincerely reflected crucial safety requirements and rights issues learnt from the earthquake. The ´Right to Housing as a Fundamental Right in Post - Earthquake Nepal` is one of them (Ghimire, 2019). The Kathmandu Valley has seven UNESCO World Heritage Sites of which Pasupathi Nath by the Bagmati river, as tributary to the Holy Ganges, has significant regional Hindu and national as well as international importance. The new Constitution has also reinforced national conservation rights, and

cultural and natural conservation sites and such areas of international significance and importance (Adhikari, 2018). While this did not contribute to the Balkhu-Sanchal riverscape directly due to its lack of cultural sites, the overall impact is something to look forward to.

As described by Mr. Brajesh Adhikari, new rules were on the way of implementation – for example less than 80 sq.ft buildings could not be constructed, and all sites had to have 20ft wide and clear access ways. These rules wanted to ensure that the already dense city is not densified further by congested establishments. Unfortunately, many areas like Balkhu-Sanchal have already reached the brink of issues to be addressed. Hence other ways of creating healthier spaces need to be introduced.

5.4.7 2016-2019 AD

Few of the post-earthquake years were spent by the nation gathering its pieces and struggling to keep up with developmental plans and projects. In the case study area, the Balkhu bridge extension project showed slow yet continuous progress through 2016, 2017, 2018, before finally achieving completion in 2019 (as seen in Fig. 5-40 to 5-43). As for the Bagmati river, the changing shape and width is reflected in the satellite images through 2016-2019. 2016 has a narrow and noncontinuous shape of flow, probably due to high ongoing dredging and construction process of the sewage pipe network project. It is important to acknowledge that the season during the image recording must have had obvious implications on the water volume as well (for example wet monsoon vs. dry summer). Nonetheless, some credit of the water flow improving by 2019 can be given to the progression of the sewage project to a less disruptive stage (though still a long way to go)

Figure 5-40 to 5-43, Case study area from 2016 to 2019 (adapted by author from Google Earth)

5.4.8 2020- 2021 (current) AD

This final chronological section brings us to the last google Earth satellite image available of the case study area, which is of 2020- fortunately not too outdated from the current year of 2021. On this bird's eye view (Fig. 5-44), the width of the river looks pleasantly more stable and less chaotic as compared to earlier years. This is the outcome

Figure 5-44 case study area in 2020 (adapted by author from Google Earth, 2021)

of the ongoing governmental (under HPCIDBC) mega project the 'Bagmati River Basin Improvement Project' (BRBIP) which was drafted to be approved by 2013. It was initiated in efforts of leaving behind the ad-hoc and uncoordinated management style and instead welcome the concepts of 'Integrated Water resource Management' (IWRM) – "social equity, economic efficiency, and environmental sustainability" (International Water Association, 2021). Meanwhile the time-scope of HPCIDBC's Bagmati Action Plan (BAP) was soon coming to an end (2009-2014). Yet many of BAP's interventions were not near fulfillment due to financial and capacity shortfall. Hence, the drafting of BRBIP was done after critiquing BAP, such that its objectives could be carried forward more efficiently by BRBIP (Asian Development Bank, 2012). It had 5 key objectives (BRBIP, 2021):

Table 5-3 Key objectives of BRBIP (2021)

1.	Established systems and capacity for integrated and participatory river basin management.
2.	Improved riverbank environment in urban areas.
3.	Increased water availability in the basin during dry season and watershed conservation.
4.	Functioning flood forecasting and early warning system for the Bagmati River Basin.
5.	Efficient project management with effective stakeholder communication

Out of the above, objective no. 2 had the greatest visibility as it included the full-fledged construction of a 7.2 km long bagmati corridor "constructed with aesthetic river walls and recreational amenities", integrated with tree lines, footpaths and possibly bicycle lanes as well (BRBIP, 2021). The high profile construction process once again began from the centrally located section of the Bagmati river. Hence it took until end of 2019 to reach Balkhu-Sanchal!

The conceptual visualizations of the BRBIP promoted by the HPCIDBC (Fig. 5-45) boast of beautiful green spaces spilling into a sparkling Bagmati river, complemented by

paved sidewalks and ghats that allow direct physical and visual connection with the river itself. The riverscape is further advertised as being complemented by the Valley's beloved Jacaranda trees lines within decent green belts running along the corridor. Overall a mesmerizing picture has been painted. But how much of it will materialize in reality?

Figure 5-45 Conceptual visualization created by BRBIP (2021)

While the conceptual visualizations provide much needed hope to people, it would be foolish to assume the lovely "image" will be recreated anytime soon. But the anticipation generated by the simple act of providing a visual in itself tells the story of how influential "image" and "perception" can be.

Moreover, the visualizations do not adhere to the whole of the river's length, especially not the Balkhu-Sanchal section – made clear by the 'developments' that started emerging through 2020 and 2021. First and foremost stone retaining walls (Fig. 5-46) were created on both sides of the river, which Mr. Anup Baral assumes would

provide some form of flood protection and prevent the encroachment from going beyond the present state at least. But he is still skeptical of the project because:

> "While they have installed sewage pipes, there is still some noticeable leakage into the river. While on paper the waste disposal into the river has stopped, there are still several informal dumping points that hinders achievement pf the purposes of the projects. Things seemed to be properly controlled at one point in time, but now again they have become loose with the regulations I think."

Figure 5-46 Stone retaining wall construction in case study area in 2019 (Ray4u, 2019)

Of course, this was through the early months of 2020, which was as we all know marked by the global pandemic COVID-19. Like in most countries, the spread and impacts of the pandemic in Nepal and the Kathmandu valley has been unimaginably devastating. In fact, months, and a year later in 2021, the Valley is still grappling with heightened hardships and Valley-wide lockdowns due to COVID-19. Moreover, the dense Balkhu side of our case study area has proven to be more vulnerable to the pandemic as seen through the infection rates (Ojha, 2020). Mrs. Sova Sapkota, current chairperson of ward no. 14 (KMC), hence Balkhu "tole" explained to the news outlet- 'The Kathmandu Post' that since Balkhu, Kalanki, Kalimati (also Kuleshwor) have

many low-income renters who could have recently travelled in from out of the valley (from higher infection rates area), the cases have become likely to be high. Hence this addition of substantial amount of uncertainty and fear, has caused many disruptions in the daily lives of people and in the already challenging Bagmati River Basin Improvement Project (BRBIP).

Nonetheless, the construction process has been moving forward little by little. Through the end of 2020 and currently in 2021, the BRBIP has been extending the footpaths and putting up boundary through Balkhu-Sanchal (Fig. 5-47/48/49/50/51). This was not only described by the Sanchal resident interviewees, but also clearly seen through the 'video observation' of the case study captured by the field assistants.

Figure 5-47 Footpath and wall construction around Bishnumati confluence- few meters north of case study area (taken from video by author's field assistant, 2021)

Figure 5-48 Footpath and wall construction within case study area (taken from video by author's field assistant, 2021)

Figure 5-49/50/51 Ongoing construction moving towards the south boundary of the case study (taken from video captured by field assistants, 2021)

above images grabbed from the said videos show the various stages of the boundary wall-footpath construction from north end to south end of the case study area. The demarcation provided by the boundary walls cuts off direct physical and visual interaction between the river and the people, unlike proposed by the conceptual visualization by HPCIDBC (Fig. 5-45). This could be mostly beneficial for a chaotic site like Balkhu-Sanchal, as it would restrain people from polluting the river to some degree. But it could have major long term repercussions like elevated loss of emotional, social, and cultural connection with the river. Already the Balkhu-Sanchal riverscape lacks greatly in those, with people commuting/ visiting only for work purposes (corridor construction or, employed at various automobile/hardware shops along the roads, as seen in Fig. 5-52/52). The project proposals have constantly proclaimed the integration of trees and green belts along the river. While the 'development' has not reached that level in Balkhu-Sanchal yet, we can only hope that it is acted upon in the near future because as rightly voiced by Ms. Asmita Bajracharya :

> "Despite the plans to create green pockets, with the amount of concrete that has been used for retention walls it's difficult to say if these initiatives will help the river recharge through a natural process. The development purposes of the river project focus more human-convenience ('brown' agendas), superficial beautification of the riverscape, and development of new roadways. I do not see the sustainability of these projects- the government still has not even managed to connect the sewage pipes from all settlements to the Bagmati sewer system!"

Definitely to contribute to preserving and improving the river's ecosystem is a much larger, and higher level goal, where the superficial beautification can only contribute in part. Only when co-ordination within smaller goals and stakeholders is developed, the wholistic goal of rejuvenating the riverscape and its image can be (possibly) achieved. In addition to the river adjacent landscape, the roadside shops/ businesses also make an integral part of the riverscape 'image'. As discussed earlier, the 'scale

effect' has strengthened the dominance of automobile and construction based enterprises along the corridor roads (Fig. 5-52/53).

While they also represent an important part of the population and their economic needs should not be undermined, there is a huge need to regulate their activities and growth. If not, their growth will keep hampering the river-ecosystem despite efforts to rejuvenate it. Many residents put forth their dissatisfaction towards the multiplication of such enterprises in Balkhu-Sanchal, including Dr. Niva Baral:

> "It will be great if the number of scrap collection sites / garages etc. can be decreased here. It causes a lot of disturbances for us residences, and also degrades the environmental quality. Why can't there be other kind of shops here?"

Figure 5-52 Automobile garage and warehouse in Sanchal (Google Maps, 2016)

Figure 5-53 Sanchal corridor dominated by vehicle and related shops (taken from video captured by field assistant, 2021)

Figure 5-54 Picture taken from house on Sanchal side, showing demarcated land for park in 2021 (provided by Ms. Asmita Bajracharya, 2021)

As for the Shahid memorial park on the Sanchal riverside, (encircled in red in Fig. 5-54), up until now it has been widely neglected and simply been left after its demarcation. But now with the progressing BRBIP, it has a huge scope of being transformed into a proper green urban pocket. But while doing so, it is vital to that BRBIP does not plainly use it as a decorative sprinkle. Instead, it should be integrated with landscaped amenities such that it attracts social activities. Decent inspiration for this can be taken from another green pocket already established along the Bagmati corridor- the Shankhamul Park (Fig. 5-55). The Park has been able to create a social identity and "image" of its own. With an inviting appeal, and good visual/ physical connection with the river, it has been able to somewhat change the 'perception' of the possibilities of 'human to environment' relationship. Clearly impressed by the park, Ms. Sneha Adhikari expressed that-

> "If the shahid memorial park can recreate the park in Shankhamul, it will be fantastic.Maybe we could introduce fruit trees as well to the scheme. Even

> if people come to pick them up, no problem! It might help people be more invested in maintaining it if it provides them with produce. I have such concepts working well in few countries, maybe it is worth a shot here as well?"

Figure 5-55 Well maintained Shankhamul park, an inspiration (Google maps, 2021)

While there are several efforts and plans floating by, they have not received the vote of confidence of all due to a history of incompetence and conflicts. The lack of assurance was clear in Dr. Niva Baral's statement, as she concluded the interview saying-

> "The plans may be good, but in my eyes the project is already a failure due to inefficiency. It has already been 10 years since they started constructed the road here. And every time they come back it is like they start from square one. I hope it is not the same this time, because a lot of resources have been spent on this. Really hoping the scenario and image of the place will be changed by the next 10 years at least".

The 2021 monthly water quality reports of the Bagmati river have been made available to the public by the HPCIDBC (2021). Looking at the latest recorded month of April 2021 (Table. 5-4), the Dissolved Oxygen (DO) has dropped down to miserable 'nil' (from 1.85-2.45 range in 2007) and the Biological Oxygen Demand (BOD) has had

a massive spike of 400% (from 80-97.5 range in 2007) (KAPRIMO, 2007)! The comparison has been made with 2021's measurements on the Bishnumati-Bagmati confluence (marked by red rectangle, that is the nearest point from the case study area in the list of sample locations for 2021 – Table. 5-4).

Table 5-4 Water quality report of various sites of the river (HPCIDBC, 2021)

Sampling date	Sampling site	pH	Turbidity (NTU)	TSS mg/l	TDS mg/l	DO mg/l	BOD mg/l	COD mg/l	Fecal coliform CFU/100ml	Total phosphate mg/l
2077.12.20 (2.04.2021)	Sundarijal	7.8	6	12	28	6.7	8	18	$56x10^1$	0.2
	Gokarna	7.7	245	276	148	4	45	92	$92x10^2$	2
	Jorpati	7.5	440	382	314	0.5	160	332	$38x10^4$	3.3
	Guheswori	7.3	36	64	76	4.7	38	64	$72x10^4$	1.8
	Aryaghat	7.4	65	75	82	3.6	42	78	$58x10^4$	2.6
2077.12.23 (05.04.2021)	Minbhuban	7.6	240	310	482	nil	328	588	$44x10^6$	6.7
	Manohara and Bagmati confluence	7.4	322	346	510	nil	334	622	$72x10^6$	6.3
	Thapathali	7.3	228	188	344	nil	282	510	$39x10^5$	6.8
	Bagmati and Bishnumati confluence	7.4	312	286	426	nil	354	656	$77x10^6$	5.6
	Sundarighat	7.1	298	330	392	nil	402	680	$83x10^6$	6.5
	Chovar	7.5	341	356	422	nil	384	702	$67x10^6$	6.3

Analyzing the above statistics, the need for Balkhu-Sanchal riverscape's image rejuvenation is eminent and a huge task at hand. And it would not be possible if people do not have belief in it. Without their confidence, it is hard to generate commitment and sense of responsibility within the people. And without those, it will become a bigger challenge to maintain and continue the efforts put in by various individuals/ organization/ communities or authorities. Reflecting on the problems of the past, it is clear that trans-disciplinary is requisite. One where all stakeholders are heard and empowered, and where there a good blend of 'green' and 'brown' developmental goals. This should be the paramount mission, or else- all the mighty efforts will still fail. Instead, we will be dealing with a vicious cycle of wastefulness. Figure no. 5-56, shows basic section of Balkhu-Sanchal, where the built up has overwhelmed the river. This is the saddening outcome of years of transformations (Table. 5-5), and it is high time that is it reversed

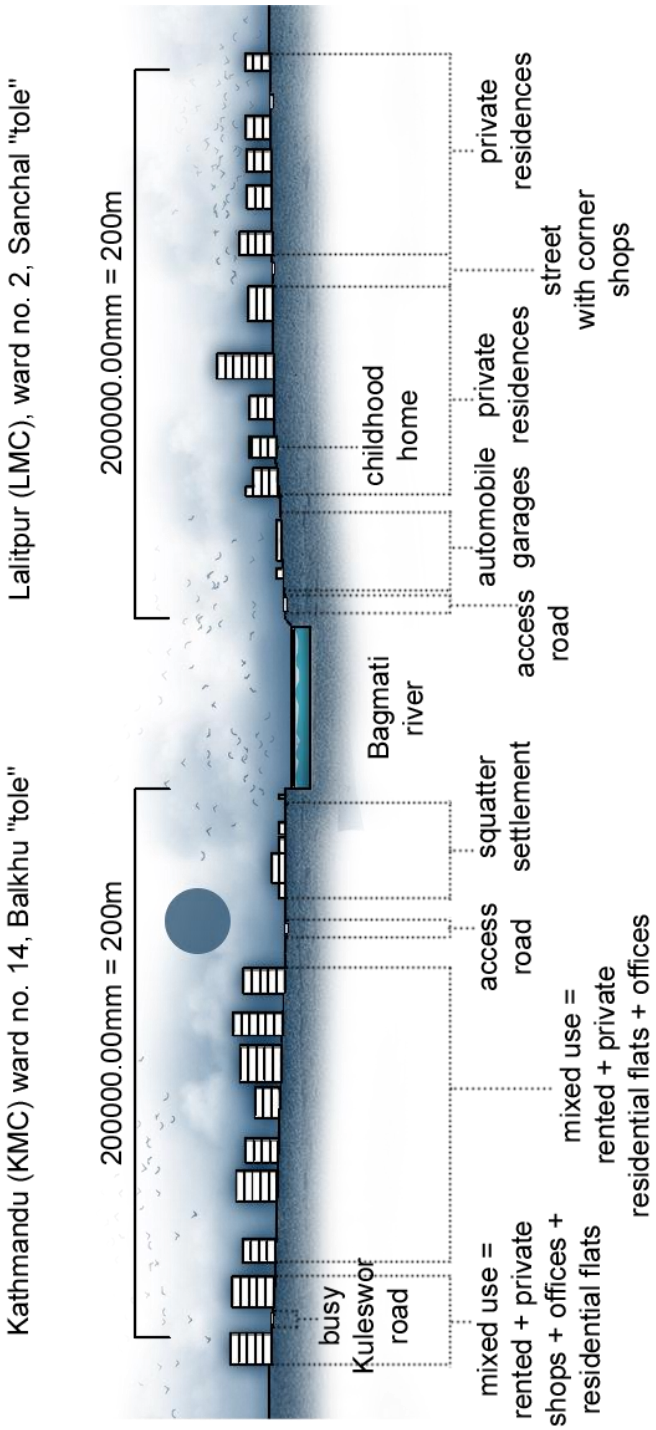
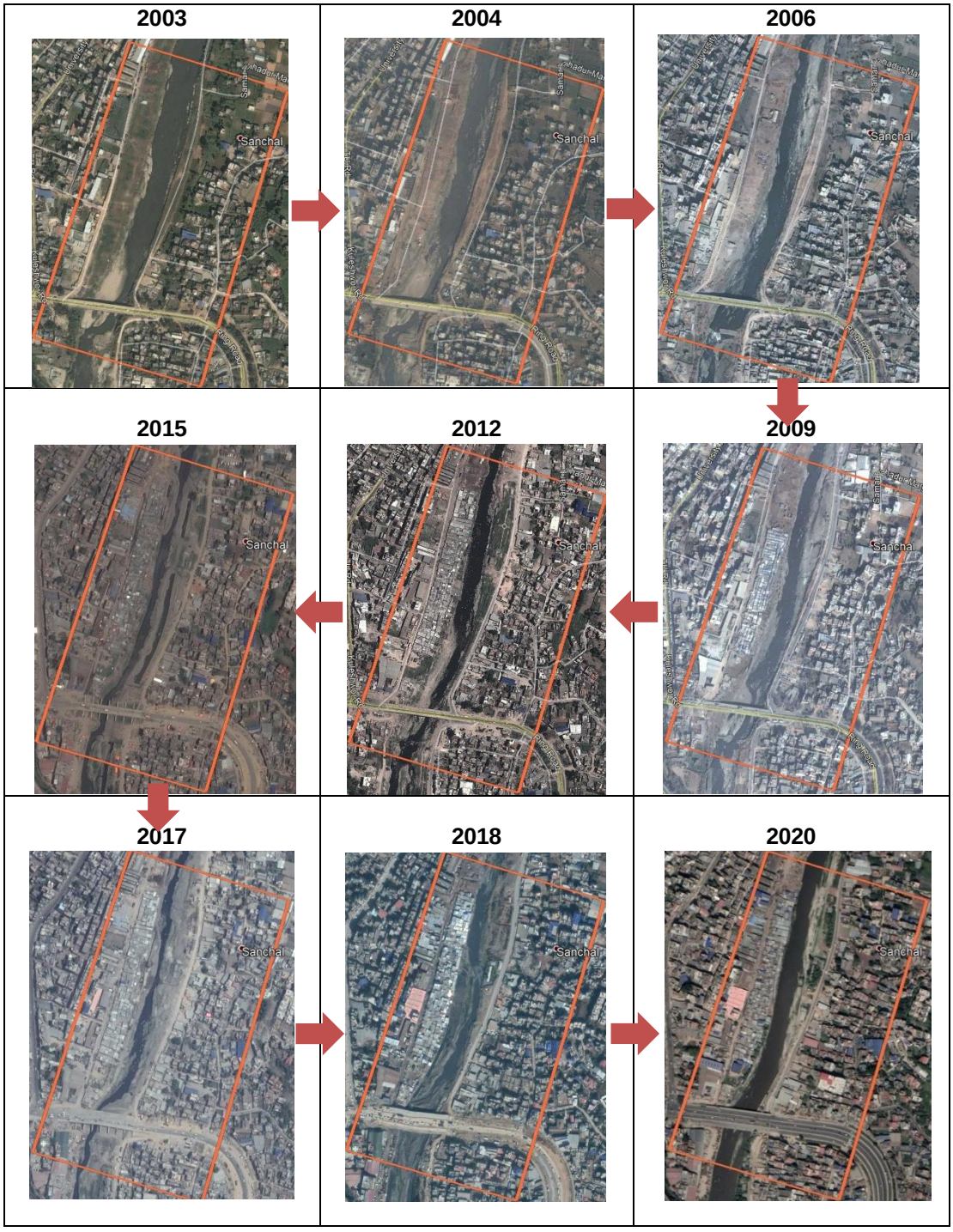


Figure 5-56 Basic section through the Balkhu-Sanchal case study area showcasing the relation of the built-up with the Bagmati (author, 2021)

Table 5-5 Transformation of the Balkhu-Sanchal through the years (Google Earth adaptation)



6 Findings and Project Implications

The case study chapter helped shine light on the Balkhu-Sanchal riverscape's evolution through varying time periods. In doing so, it illuminated elements that help answer the SRQ1 and the SRQ2, interwoven into the narratives:

SRQ1: *"What role has various green and brown agendas played in transforming the imagery of the Bagmati riverscape, and vice versa? And what problems, but also opportunities, have been created and call for attention due to this complex and wicked transformation?"*

SRQ2: "Who are the stakeholders involved, and what are their priorities? Why is it important for civil society and local government to support the stakeholders' diverse interests and rights in order to truly rejuvenate the imagery and in building citizens´ collective ownership and responsibility ?"

Moving on to this chapter, it will be supported by the Logical Framework Approach (LFA). LFA is a sequential guide that promotes rational thought process, and hence come up with logical and structured actions to address problems and opportunities (NORAD, 1996). While ideally LFA is to be performed with the stakeholders of a project, it was out of scope of this thesis. Hence it was carried out through a brainstorming session in June 2021 (Annex- 5). It is essentially divided into the following components:

a) Participation analysis
b) Problem analysis
c) Objectives analysis
d) Alternatives analysis
e) Project elements (PM)
f) Assumptions (PM)

g) Indicators (PM)

Here points (a) to (d) will form the ‘findings’ section, where point (a)- ‘Participation analysis’ will extensively address SRQ2 and points (b) to (d) will present the answer to SRQ1 in a structured fashion. The rest (e to g) will contribute to the 'implications’ section and respond to the main research question (RQ):

“How can we merge and evolve green and brown agendas to rejuvenate the imagery and the environmental and social awareness around the Balkhu-Sanchal riverscape, and build a healthy sustainable river environment ?”

While progressing through this chapter, it is important to note that due to certain challenges in the scope of the thesis, the LFA analysis presented has limitations. Hence some assumptions have been implied (the acknowledgment of which is also an essential part of the LFA).

6.1 The Findings

6.1.1 Participation Analysis

Since Bagmati river as a whole holds a very prominent status in the valley, the number of individuals, communities, organizations, and authorities involved are quite high. We shall narrow them now and discuss only the ones that are relevant to the case study area. The following stakeholders are categorized into 5 sub-groups:

- Governmental authorities
- Local residents
- Squatter settlement and supporting organizations.
- Non-profit organizations

- Local enterprises
- Local health and educational institutions

- **Governmental authorities:**

These governmental authorities are expected to engage in long-term and large-scale planning. Though ideally their plans should be a good mix between green and brown agendas, the trend of brown agendas is dominating during implementation. This has my been observation. Government authorities have the highest degrees of decision-making power. However, generally they focus on broader societal and environmental development goals. Hence, their interest is divided between many different issues and localities, and the case study area does not get their full priority.

a. **The National Planning Commission (NPC):**

The National Planning Commission (NPC) is a high ranking governmental organization with a specialized task of establishing the national vision through socio-economic developmental policing and periodic planning. It is a focused on resource requirement evaluations, finance source identifications and fund allocations. The NPC acts as the principal organization responsible for appraisal of the various developmental strategies through scheduled monitoring (NPC, 2021).

Since Nepal is a UN member-state, the NPC has undertaken the incorporation of the 2030 Agenda of Sustainable Development Goals (SDGs) into its national vision. In fact, they showed their dedication towards the SDGs by becoming the first country to produce an official SDG country evaluation report in 2015 (NPC, 2021). The SDGs as described in section (2.1.3) having 17 total goals, out of which

at least 10 (or more) have targets that respond to the polluted Bagmati riverscapes and the squatter issues. Hence, making Balkhu-Sanchal riverscape also a small part of their vision.

b. Department of Urban Development and Building Construction (DUDBC):

This department falls under the Ministry of Urban Development (MoUD) of the Nepalese Government. It has the power to formulate, plan and implement urban policies on a national level. It oversees all construction and housing plans and aims to allow for a sustainable urban development (DUDBC, 2021). The emergence and growth of the massive Balkhu squatter settlement has been able to draw their attention recently, leading to physical mapping studies being initiated from DUDBC's side (NEST, 2010).

c. High Powered Committee for Development to Bagmati Civilization (HPCIDBC):

The governmental agency under the MoUD- HPCIDBC, dates back to 1994, when it was named the 'Committee for Implementation & Monitoring of Environmental Improvement in Pasupathi Area'. Since the need to cater to more than just the Pasupathi area of Bagmati river was registered, the agency was renamed in 1995 as 'High Powered Committee for Implementation & Monitoring of the Bagmati Area Sewerage Construction/Rehabilitation Project (BASP)'. After further broadening of scope and goals, it finally gained the current identity of HPCIDBC in 2008. As the name already suggests, this is a specialized committee devoted towards the Bagmati river and has ample financial, technical, and human

resources. The HPCIDBC implemented the Bagmati Action Plan (BAP) from 2009-2014, and currently is busy with the Bagmati River Basin Improvement Project (BRBIP). While it is the lead implementation agency, it faces issues with overlapping mandates with other organizations, and needs to take charge of integrating them into a wholistic plan and avoid conflicts (Basnyat and Laitos, 2012).

d. Kathmandu Valley Development Authority (KVDA):

The Government of Nepal (GON) officially initiated the "Kathmandu Valley Development Authority Act 2045", which made way for the set-up of the KVDA in 2012. It is another organization under the MoUD and has been commissioned to devise coherent developmental plans for the integrated Kathmandu Valley, and thereon implement it as well. Since the Valley comprises of more than 1 district, the KVDA has authority over 5 (urban) municipalities and 99 rural municipalities 9 (previously called Village Development Committees- VDCs) (KVDA, 2021). Since KVDA is responsible for the overall development of the Valley, its focus themes include but go beyond just the Bagmati river and hence might have differential approach than HPCIDBC (Basnyat and Laitos, 2012).

e. Ward Committees:

Since the ward committees stand much lower in the organizational hierarchy structure, and the members are locally elected , it means that they are likely to show more interest towards the small- scaled case study area, and their local electorate, as compared to the above authorities. But at the same time, they typically focus more on 'brown' agendas (Basnyat and Laitos, 2012), which is why they need to be

introduced and incorporated into a different kind of proposal that caters to 'brown' as well as 'green' needs. Their hierarchal ranking means their decision-making power is lower as compared to the above bodies. Nevertheless, their platform can and should be used effectively to mobilize their local reach and help achieve great strides.

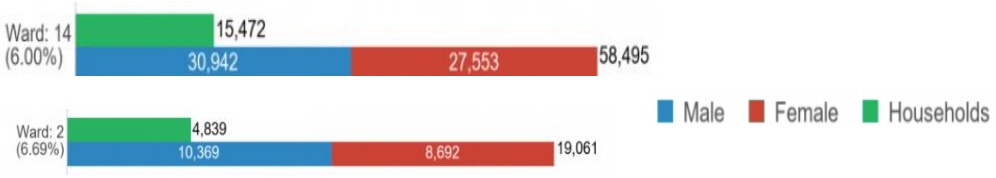


Figure 6-1 population and household of KMC ward 14 (on top) and LMC ward 2 (on bottom) (Karki, 2019)

Since the case study area encompasses 2 different wards (ward no. 14 from KMC, and ward no. 2 from LMC), both will have to co-operate in order for the project to be success.

The KMC consists of 32 municipal wards, where ward no. 14 houses 58,495 people (6% of the municipality's total) (Fig. 6-1). This makes it the 5th most populous ward with 15,472 households. As for LMC, it has a total of 29 municipal wards where ward no. 2 is its 2nd most populous ward (6.69% households of 70256 total households in the Lalitpur district) (Fig. 6-1).

- **Local residents:**

This subgroup includes all the local residents of Balkhu-Sanchal except the Balkhu squatter settlement. They will be discussed in a separate section next, as their interests and issues differ widely from this subgroup.

a. Balkhu 'tole' residents (not inclusive of squatter settlement):

The Balkhu 'tole' is located in KMC on the left side of the Balkhu-Sanchal riverscape. It is separated from the direct riverbank by the Balkhu squatter settlement. It encompasses of 3-6 story buildings, and the residents are mostly low-income migrant renters originally from Terai (Ojha, 2020). Hence the density can be assumed to be quite high. Their nature of employment (low-income generating), nature of residence (temporary) and physical separation from the riverscape, all suggest that they may not have substantial interest in the riverscape's rejuvenation. Their priorities lie with the overall 'brown' development of the area and personal economic growths. Hence, the project could devise ways of providing financial incentives to attract their support. Their contribution will as a result improve their environment, which may not look like their direct concern, but can inherently elevate their living standard.

b. Sanchal 'tole' residents:

The Sanchal tole is situated on the right side of the case study area, under LMC. Being one of the biggest municipalities of the Kathmandu Valley, LMC sees huge diversity of people. Getting accurate demographic data of the Sanchal tole was out of scope of the thesis. Hence, the statistics of LMC helps give at least an impression of the profile. A general look at LMC's demographic profile shows that its literacy rate is higher than the national average (85.99% vs. 67.91%) and its sex ratio is lower (104.9 vs. 84.55 males per 100 females).

While the caste-based distribution of LMC (Fig. 6-2) shows a dominance of Newars (Nepal Archives, 2020), it is likely that the specific numbers for Sanchal tole is much more balanced, as it is a mix of old as well as new inhabitants of the Valley. Majority of the Sanchal tole residents can be assumed to belong to a middle

income group with family dwellings of permanent residency (based on researcher's past living experience in the area).

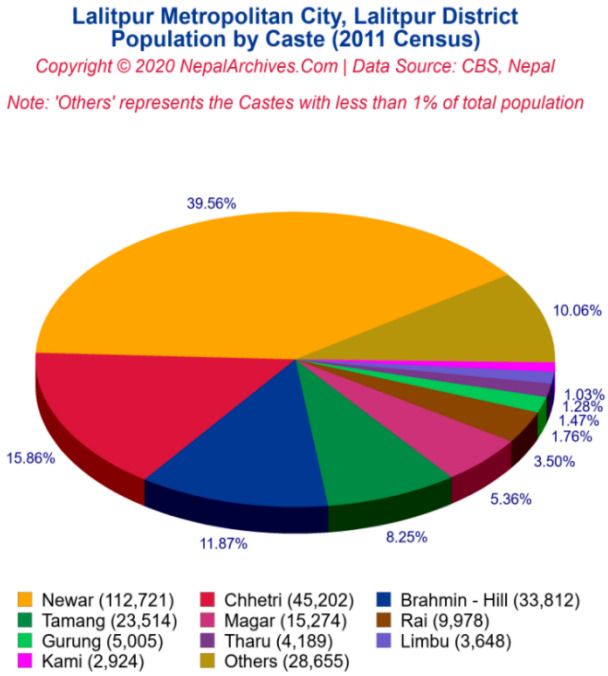


Figure 6-2 LMC population by caste- CBS 2011 (Karki, 2019)

Due to the nature of their lifestyle, the Sanchal residents have greater social interactions among themselves (as compared to the 'Balkhu' tole). Hence, they have created an informal system of regular 'tole' get-togethers, attended by at least one representative from each household. The aim is to build a robust social network that can come together to discuss local issues and possible solutions. While the Sanchal households also face many problems regarding inefficient services (roads, water supply, electricity- brown agendas), they are not extremely urgent. Their lifestyle is comfortable enough to be able to endorse both green and brown agendas. Moreover, their direct adjacency to the riverscape allows the kind of sensitivity and attachment to the issue that the 'Balkhu' tole lacks . While their desire for an integrated

development is very much in-sync with the agenda of this thesis, their idea of integration might fall short in considering the squatter settlement's needs. The proposal ahead will aim to decrease this conflict of interest and create a middle-way.

- **Squatter settlement and supporting organizations:**

a. Balkhu squatter settlement:

The Balkhu squatters live in a settlement with approximately 375 households and 1800 people. In a very detailed situation analysis done of the Balkhu settlement, the following points were noted (Rumba, 2014):

- The people were of diverse backgrounds and a mix of migrants from both Hilly and terai regions of Nepal (with houses on back row and front rows respectively- Fig. 6-3)
- They migrated to Balkhu in search of employment opportunities after being displaced by natural disasters, political instability etc.
- Their past experience with authorities and organizations has created lack of trust.
- Their houses are extremely vulnerable to flooding, fire as well as earthquakes.
- They are not recognized as a residential area by the government, hence have not received facilities by them. Instead, the services they use (electricity and water) were provided through NGO interventions.
- Their biggest concern is of housing insecurity, as the government have in past tried to intervene and evict the dwellers of other squatter settlement in the Valley. Their fear for this uncertainty is so huge that it overshadows their concerns over physical living conditions and environmental health.

- The pathetic quality of water and lack of overall sanitation makes the residents prone to health risks, but once again this concern is not their priority in the face of housing insecurity.
- The communal toilets are visibly discharging into the river and are extremely unhygienic.
- Unemployment is a major issue faced by youths, which has led to unproductive environment full of conflicts.
- It was typical for the families to be male headed. Females were rarely employed or paid very poorly and were limited to taking care of the house and children.

Figure 6-3 Division within the Balkhu squatter settlement (Rumba, 2014)

The above points make it clear that their living conditions are extremely poor and vulnerable. They deserve the urgent attention of the authorities; yet they are not receiving the help they need. In fact, due to conflicting stakeholder interests

they are typically targeted for eviction. While we can all acknowledge that their settlement poses extensive threat to the riverscape's health, their eviction (or the attempt of it) has only caused counterproductive clashes in the past. Hence, there is a need to shift the gears into making them part of the rejuvenation process instead. A local committee called the 'Akhil Samaj Samittee' acts as their representative body, and they can be mobilized to create a healthy dialogue.

b. Lumanti:

Established in 1993, Lumanti is an NGO that has been working vigorously to support and uplift the squatter of the Valley. They have been critical in addressing the themes of urban poverty and shelter deficits of Kathmandu and advocating the rights and needs of the vulnerable groups, especially female-headed households (Lumanti, 2021). Lumanti has worked with many squatter settlements so far, but unfortunately, their efforts have not reached the Balkhu settlement yet. Despite that, there is huge scope for their initiatives in Balkhu, as it is one of the biggest squatter settlement of the Valley (NEST, 2010). Lumanti in the past has helped form grassroot groups to improve vulnerable group's capacities, which is something the Balkhu squatters can greatly benefit from. Being an organization with resources, professional contacts, and experience, they can act as the congenial link between the squatters and other stakeholders and decrease conflicts (Basnyat and Laitos, 2012).

- **Non- profit organizations:**

The following non-profit organizations have very straightforward goals of serving the rejuvenation of the Bagmati river. Hence their agendas will find an inclination towards 'green' goals complemented with stakeholder participations.

a. The National Trust for Nature Conservation (NTNC):

NTNC was created in 1982 as a legislative measure to work towards nature conservation themes- biodiversity, climate action, clean energy, sustainable environment etc. (NTNC, 2021). Their specialty is their engagement and employment of local skills for their projects. Due to their expertise in the field of nature conservation, they were brought in by the HPCIDBC to formulate (and later help with implementation) of the famous Bagmati Action Plan (BAP) (Basnyat and Laitos, 2012). Due to the involvement with BAP, NTNC's interest and knowledge on the whole of Bagmati has spiked. This being said, the Bagmati river, and more so the Balkhu-Sanchal riverscape is only one of their many agendas in their broad scope of work. Since they are only semi-governmental in nature, they do not have complete power, yet ample capacities to help take credible actions.

b. The Nepal River Conservation Trust (NRCT):

The NRCT was set-up by river enthusiasts who were dismayed by the declining state of Nepal's rivers, and hence decided to take matter into their own hands. Established in 1995, this non-profit organization supports an 'environmentally responsible river tourism' (NRCT, 2021) and aims to use that as a way to generate more support and awareness around the issues. One of its most noteworthy effort towards Bagmati river has been the inception of the annual 'Bagmati River Festival (BRF)' (last referred to in section 5.3.2). This 'festival of the 21st century' capitalizes

on recreational activities such as rafting, school competitions, concerts etc. to create an inviting platform for concerned stakeholders to come together for the better (Pandey, 2010). The BRF right now has focused on the origin or central sections of the Bagmati river. So, their attention needs to attract towards Balkhu-Sanchal as well.

c. Save Bagmati Campaign:

The 'Save Bagmati Campaign' (last referred to in section 5.3.5) is a community-based organization initiated by environmental activist Mr. Bikesh Shrestha in 2011. He was motivated to create an impact due to deep personal attachment to the Bagmati river since childhood. The campaign has been successfully running clean-up programs every Saturday on different section of the Bagmati river. The campaign mobilizes a bottom-up approach which has been able to attract a variety of interest groups. Unlike other organization, they have worked specifically in the Balkhu-Sanchal section as well in the past, making their experience important to learn from. Being a community-based organization, they do not hold administrative power. At the same time, it also means they can work in a targeted fashion without the complications of complex formalities.

- **Local enterprises:**

a. Local businesses:

While the local businesses are generally affected by the overall environmental conditions, their current day to day routine is not greatly hampered by the condition of the Balkhu-Sanchal riverscape. Hence, both the power and interest they have is medium ranged. They have the potential to provide meaningful contributions if

provided with incentives. As discussed earlier, there is need to fortify a mixed-development, and regulate the 'scale effect'.

b. Local vegetable markets:

The Balkhu side of the case study consists of 2 major vegetables market (marked by red circles in Fig. 6-4). Both of them bring over a huge crowd of people which is a positive social feature, but concurrently its mismanagement has led to the organic waste to be dumped into the riverbanks (Rumba, 2014). This carelessness needs to be addressed, and instead such enterprises should be collaborated with to create a cleaner riverscape. The rejuvenation of the riverscape would also boost their image luring in more customers. The vegetable sellers spend a significant amount of time in the markets, improving their own working conditions should not be very hard to promote if done effectively.

- **Local health and educational institutions:**

a. Local educational institutes:

The case study area and its vicinity has a few local school and higher-secondary educational institutes (marked by green circles in Fig. 6-4). Since they can be thought as the daily floating population, they do not experience specifically personal concerns over the Balkhu-Sanchal riverscape, except their generic desire to be part of a thriving environment. This can still be used as a motivation, and their human resource capacities can be realized for a mutual benefit.

Meanwhile, the Institute Of Engineering (IOE) is an institution that though is not local to the case study area, has had major ties with the Bagmati river throughout the course of time. Established in 1930 (Wikipedia, 2021), it is the country's pioneer in

technical schooling which is why it has remarkable reputation and good resource base. It's large network of students and faculty have contributed in various studies, projects, reports based on differing aspects of the Bagmati river for the purpose of their Bachelor/masters/PhD degrees. This extensive knowledge and experience can come in handy for the scope of the proposal ahead.

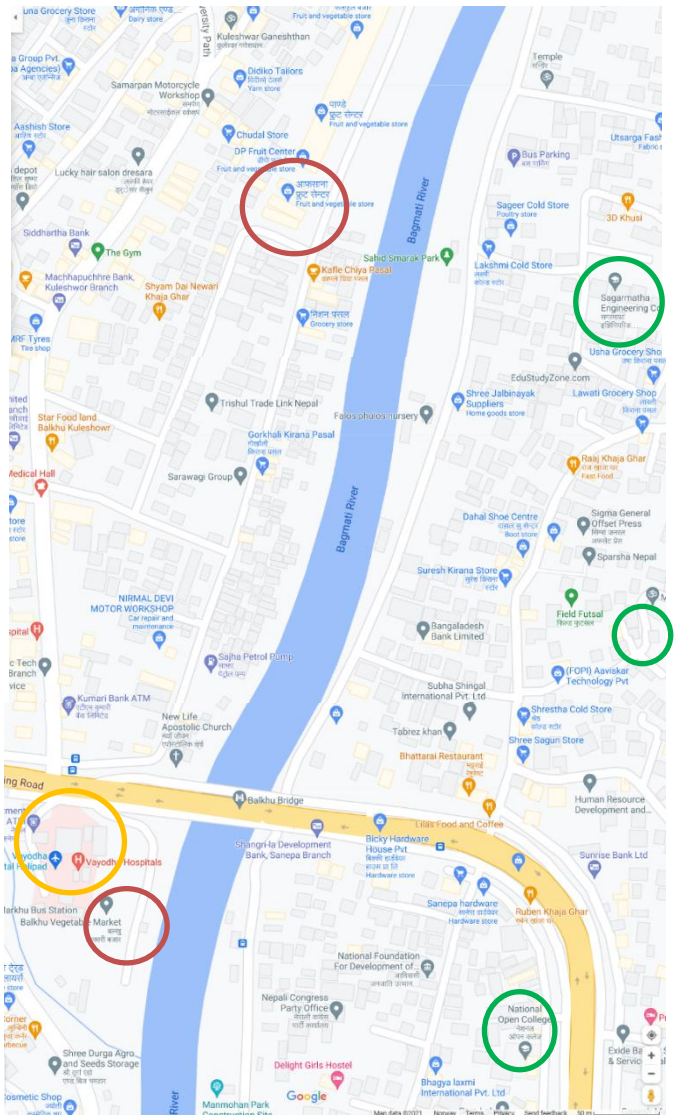


Figure 6-4 Current map of Balkhu-Sanchal showcasing various enterprises (adapted by author from Google maps, 2021)

b. Vayodha Hospital:

Vayodha is a multi-specialty private hospital located very close to our case study area in the Balkhu side (marked by yellow circle in Fig. 6-4)(Vayodha, 2021). Due to the nature of their busy and vital profession, their top priorities do not lie with the rejuvenation of the riverscape. Yet being a big enterprise, they could be interested in being part of Corporate Social Responsibility (CSR) projects related to their surrounding environment.

- **Remarks**

While in an ideal situation this process of careful group / stakeholder motivation of all partners interest are desired, it was not possible in the scope of this thesis. Hence a slightly more generic discussion over the above 4 pointers have been made as per the information collected.

- **The 'Why' question:**

The above discussion over the stakeholders addresses the first half of RSQ2: *"Who are the stakeholders involved, and what are their priorities? Why is it important for civil society and local government to support the stakeholders' diverse interests and rights in order to truly rejuvenate the imagery and in building citizens´ collective ownership and responsibility ?"* Now to answer the second half of it, let us reflect back on the 3 paradoxes of 'green' and 'brown' agendas presented by Tarafdar (2009) (first referred to in section 2.1.2, Chapter on Theoretical Perspectives). According to him, there are 3 questions that need to be clarified before planning and implementing developmental agendas (green or brown or ideally a mix of it):

- "Who takes care?"- the Institutional paradox

- "What to take care of?"- the 'Single Agenda Paradox
- "How to take care?"- the Paradigmatic Paradox

Now the very reason to look at these questions carefully is the conflicting nature of the various stakeholders of the case study area. Each group has a very different approach to the problem, and hence can also contribute in unique modes. There is a need to focus on creating a bridge between the conflict and not only on the existence of the conflicts. Often people and organization get stuck in the 'wickedness' of the overwhelming disputes. Not only the clashes but also cases of overlap have arisen in the past creating confusion and unnecessary duplication of efforts. This hints towards a very top-down and isolated decision making of each stakeholder subgroup that is not based on contextual and local comprehension. Consequentially what we have are actions that are uncoordinated and completely amiss of the glaring gaps of the true crisis. Like a bucket with holes, however much water (effort) is put in it, it never fills (achieves efficient completion) due to the leakages (gaps in identification of true 'why' 'what' and 'how').

By performing the participation analysis, a clearer picture of 'who' has the power and capacity to implement actions, 'what' are the problems with the greater urgency and scope of impact, and finally 'how' can effective impact be created; can be formulated. These help achieve strategic priorities to move ahead with the developmental planning.

The figure below (Fig. 6-5) utilizes the information gathered in the analysis above to create a simple "power vs. interest" chart. Where each of the stakeholders have been given a comparative position in terms of the power or authority they hold and the interest or concern they have in the rejuvenation of the case study area. With the help of the diagram, we can see that groups with higher concerns and interest have lower power, and vice versa – creating a mismatch that needs to be addressed. The project

proposal ahead will be an attempt to fill this mismatch by imparting power to concerned stakeholders by mobilizing them. As for the authorities with high power, yet divided interest – the goal is to attract their attention and investment through the proposal

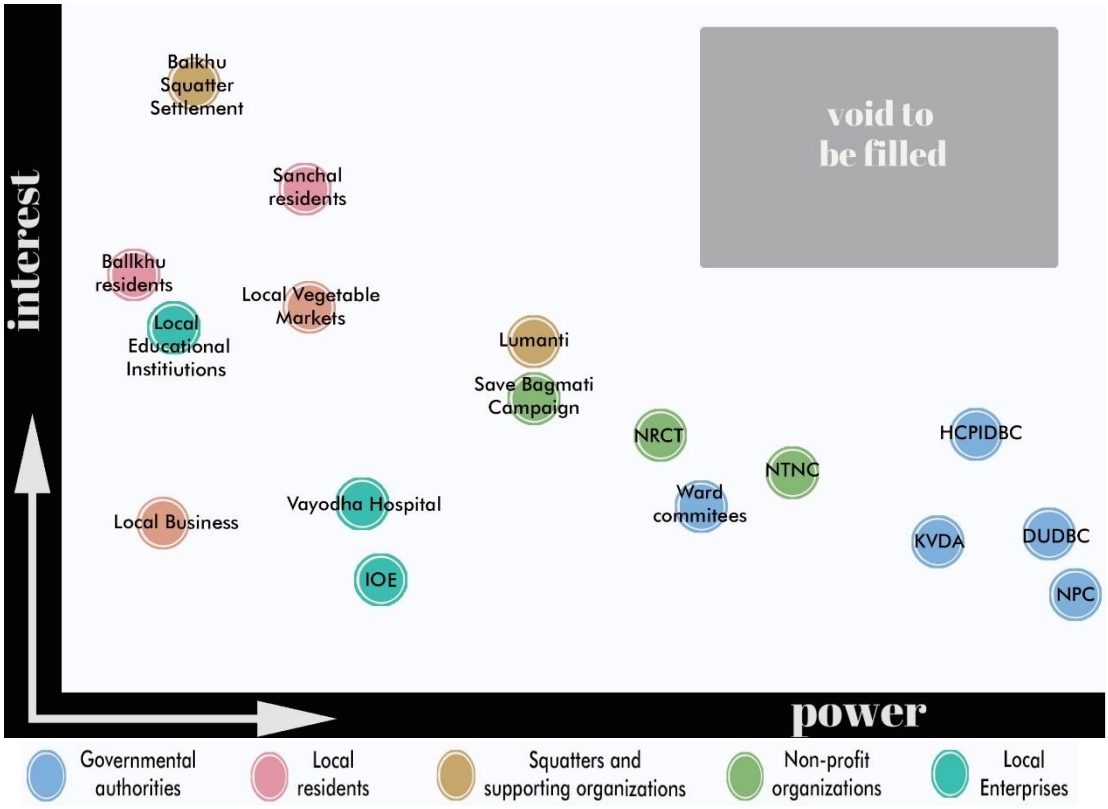


Figure 6-5 Interest vs. Power chart for the Stakeholders (produced by author, 2021)

6.1.2 Problem Analysis

I will now move on to the next step of the Logical Framework Analysis which demands us to analyze the problems of the case study area that have come out through various means in the context and the case study chapters (NORAD, 1996). There are more than one issues, but in a way, all are interrelated. A problem tree will be created that will put all the issues into perspective and seek out the focal problem among them

all. This tree will create a sequential flow through the 'causes' to the 'focal problem' and finally the problematic 'effects' of the focal problem. Overall, the findings for sub research question 1 (SRQ1) *"What role has various green and brown agendas played in transforming the imagery of the Bagmati riverscape, and vice versa? And what problems, but also opportunities, have been created and call for attention due to this complex and wicked (sad) transformation??"* will be on clear display through this analysis.

- **Causes:**

First and foremost, the context chapter allowed a detailed glance into the past settlements and kingdoms of the Kathmandu valley (approximately till 1769 AD). While the Balkhu-Sanchal area was not a part of the old settlements, the study of the history, helped understand the culture and lifestyle of people, and thee tone set by them. It was very clear that ancient Nepalese or Valley civilization (may it be Kirat, Lichchhavi or Malla) had a very innate relationship with their natural environment. They managed as well as preserved their environment through very interesting and clever techniques incorporated within socio-cultural incentives. The common 'perception' of the 'human to environment' then was based on 'theocentrism'. Hence natural elements including the Bagmati river were 'images' of Gods to the Nepalese ancestors, deserving dedicated devotion. With a limited population, the 'brown' agendas never overwhelmed the 'green' agendas. In fact, there was no need for demarcation, as everything was perceived as a system interdependent on one another.

But once modernization of Nepal began with the unification drive in 1769, a new leaf was turned. The country was developing in many fronts. This had strong repercussions like unprecedented population growth and urban sprawl of the Valley. Continuing through the rise and fall of the Rana autocratic rule (1850-1951 AD), and through the political tussle between monarchy and democracy, the Valley persistently grew. And

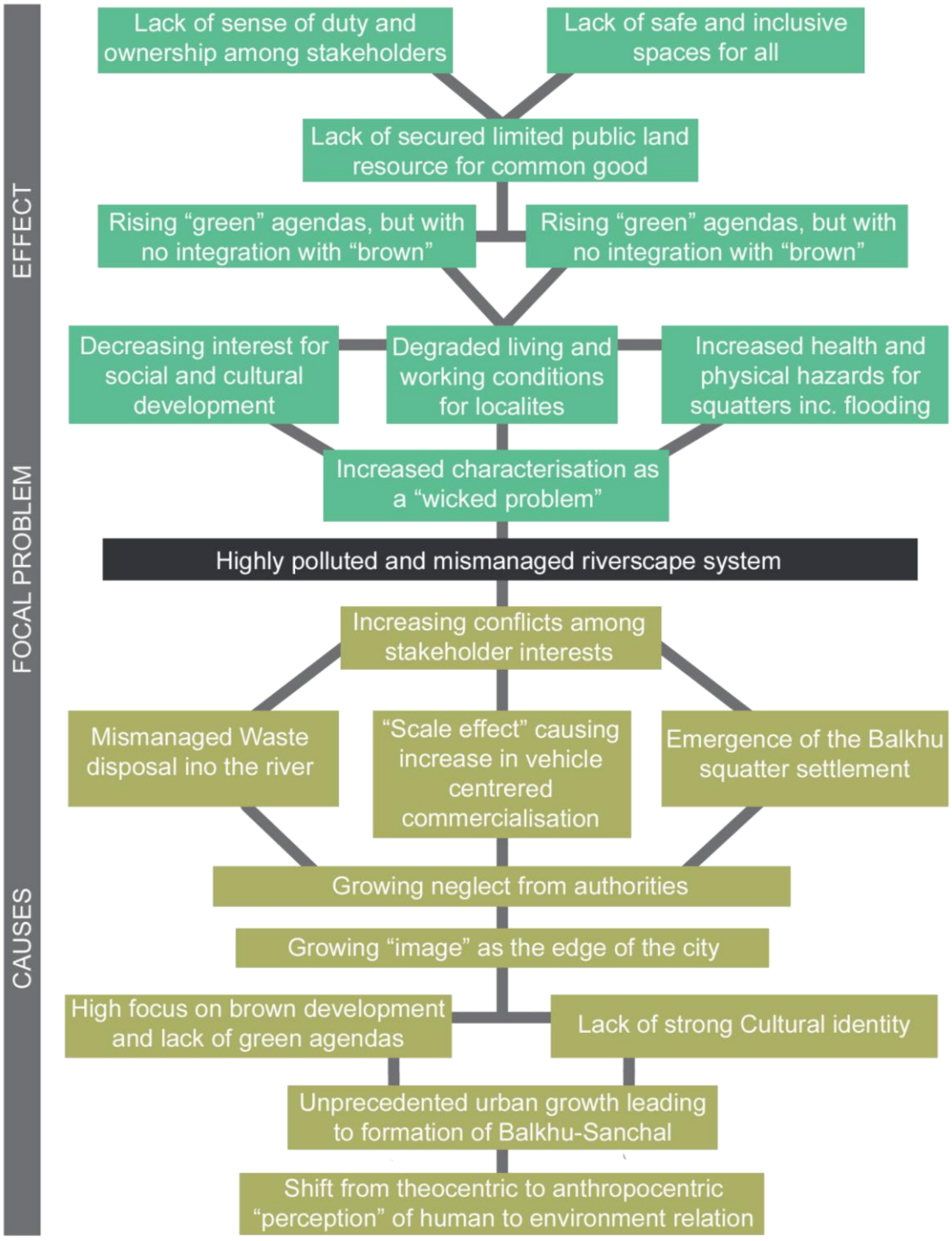


Figure 6-6 Problem tree for Balkhu-Sanchal riverscape (produced by author, 2021)

Balkhu-Sanchal riverscape started establishing. The Bagmati river was still revered as God, but it had become difficult to regulate the environment due to the high population. With escalating needs, people started becoming highly concerned with 'brown' agendas, and 'green' agendas received mass neglect- ushering the society into perceiving their relationship with environment (and hence 'Bagmati) as 'anthropocentric'. Meanwhile, some riverscapes nearer to old settlements were receiving the 'image' of 'landmarks' and 'nodes' providing them with strong socio-cultural identity. Unfortunately, Balkhu-Sanchal substantially lacked in this department, instead being reduced to the image of the 'edge' of the city. And just like the 'environmental psychology' seen and followed in ancient Nepalese, centrality equated to valuable and powerful, whereas peripheral was prone to neglect. This was also reflected in the attitude of governmental authorities towards 'edges' like Balkhu-Sanchal. Stuck in turmoil themselves, the political leaders could not provide for a prosperous 'political ecology' instead the opposite in the case of Balkhu-Sanchal.

After the year 2000 AD, concerns started rising over the scarcity of 'green' developments in Balkhu-Sanchal. But this did not cease or pause the over-enthusiasm seen towards 'brown' development- roads, buildings, bridges- basically everything seen as the 'image' of so called advancement and prosperity in western culture. People started being captivated by selfish conveniences, with no regard to the Bagmati river. 'Anthropocentrism' was reaching a wretched pinnacle. With modernized systems in place, people had no direct relationship with the Bagmati river like before. In people's perception, their water needs were being fulfilled by taps, water tanks and jars. So, the Bagmati river was conveniently diminished into a sewage and waste disposal area.

River pollution was already inflating, along with the shameful degradation of the surrounding riverscape. Balkhu-Sanchal's 'edge' identity led to a boom in its roads and vehicle networks. While that could be characterized as economic growth by many, the locals of Balkhu-Sanchal have experienced the true ramifications of it. It invited a surge

of automobile and construction based enterprises that robbed Balkhu-Sanchal riverscape of an ideally mixed-use development. This drastically impacted its 'image' and led to increased mismanagement. The riverscape was introduced to further exploitation when squatter settlements encroached the Balkhu river-side, growing exponentially through the years. While it has been clear that the encroachment is troublesome, the squatters' vulnerability, rights and needs cannot go undiscussed. But nevertheless, their emergence has pushed the possibility of 'green' development years back. Overall, it is a wicked web of problems, all interconnected and difficult to isolate- complicated further by the constant tug of war between various stakeholders and their interests.

- **Focal Problem:**

All the above 'causes' have consequentially molded the Balkhu-Sanchal riverscape into its current pitiful state. Therefore, the focal problem at hand is- the highly polluted image of Balkhu-Sanchal riverscape that continues to degrade in the wake of a mismanaged and uncoordinated riverscape environment.

- **Effects:**

The chaotic riverscape environment has had many negative causal 'effects'. While humans are at the root of the issues, they themselves bear the distressing aftermath. It all began when people started ignoring 'green' agendas and 'brushed it under the carpet' in the misconception that it would not impact them. But now the pot of problems is overflowing and has reached the people themselves. The deteriorating riverscape has remarkably degraded the living and working environmental health conditions of the localities. The reverberations experienced by the squatter settlements are much harsher, with a severe physical and health hazards (extreme sanitation and hygiene issues, flooding issues etc.).

Though such drastic worries should attract the scrutiny and care of authorities towards Balkhu-Sanchal, the polar opposite has been happening. The complex wicked nature of the case study area has discouraged interest for social and cultural development. Instead, what the riverscape has witnessed is bouts of 'brown' and 'green' developments that are implemented in extreme isolations. We had discussed earlier in the theoretical perspectives chapter that 'green' and 'brown' agendas need not be perceived in an antagonized dichotomy. They should be treated as 2 balancing elements of the same system. But this ideology has not yet been properly manifested in Balkhu-Sanchal, hence making the efforts counter-productive in many ways. What it direly lacks overall is- a secured limited public land resource dedicated to the common good. Without that, Balkhu-Sanchal falls short in creating safe and inclusive spaces. This demotivates the stakeholders into a state of inadequate sense of duty and ownership- without which even if the 'image' of the riverscape is somehow changed, it cannot be sustained.

6.1.3 Objectives Analysis

As the problem analysis distinctly revealed, there are numerous 'cause' and 'effects' in the problematic Balkhu-Sanchal riverscape. And these are bound to burgeon if not addressed. This overwhelming amount and its interplay are what makes it 'wicked'. But instead of being intimidated by the 'wicked' status, the problem tree needs to be objectively reflected upon. The LFA model provides another useful step- the 'Objective Analysis' (NORAD, 1996), that encourages a change of perspective from negative to positive. The pessimistic 'causes' are counteracted by turning them into 'means' that will help achieve the focal objective at hand-

Creating a sustainable and community supported riverscape environment.

The objective is chosen with the optimism that it would lead to pragmatic ‘ends’, and as a whole an effective ‘objective tree’ is established that will guide the upcoming processes.

Comparing the problem tree with the objectives tree, we can judge that the following vastly influenced the environmental psychology and spatial behavior in the Balkhu-Sanchal, significantly transforming the riverscape into a problematic wicked problem:

- “Anthropocentric” human to environment relationship.
- “Edge” imagery and identity.
- Extreme “brown” agendas with hints of isolated “green agendas.

So as a solution (or a modest beginning to it), we need to :

- Encourage a more wholistic “biocentric” human to environment relation.
- Shift the imagery to a “Landmark” by generating socio-cultural identity.
- Introduce a balanced blend, prioritization, and evolution of “green” and ”brown” agendas.

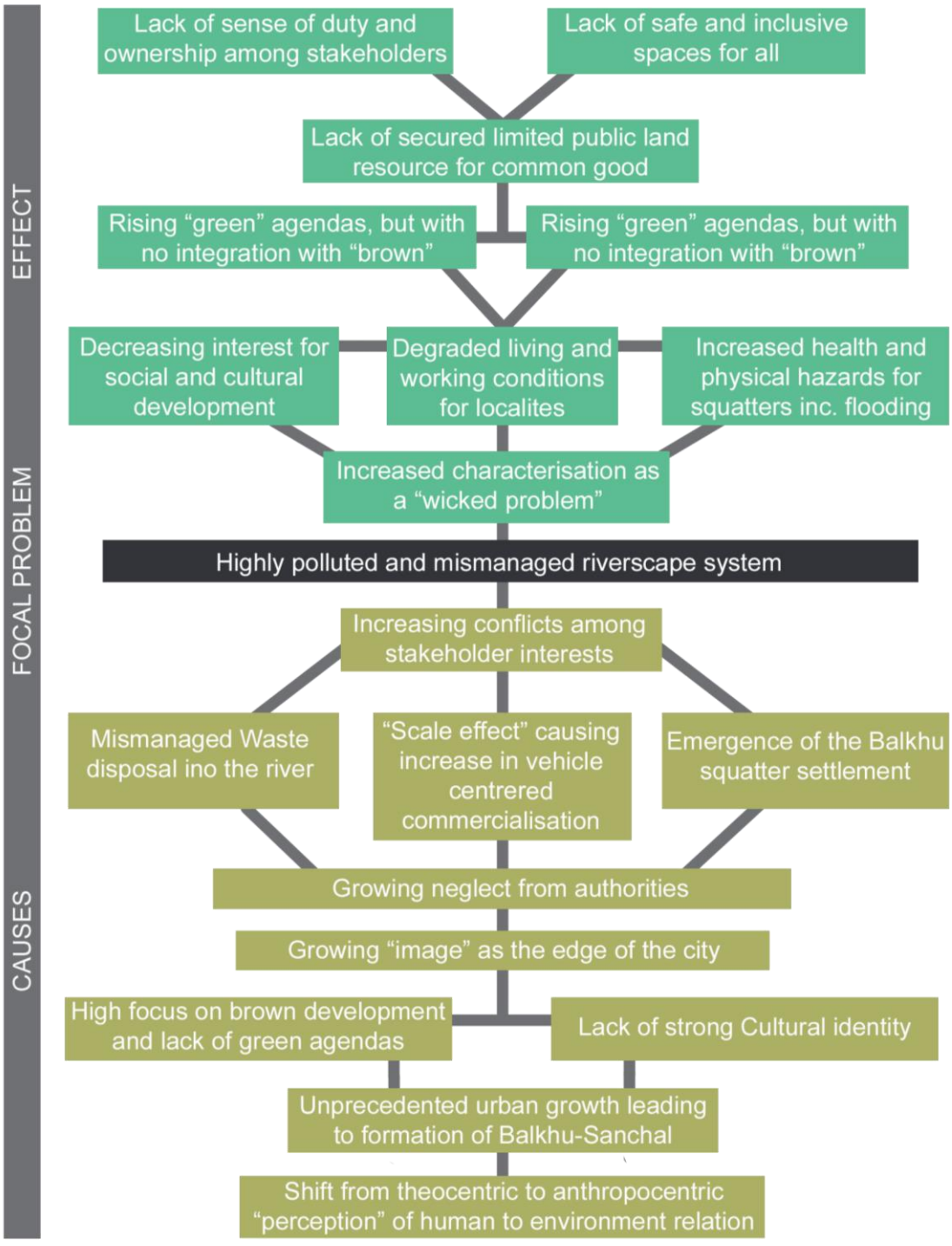


Figure 6-7 Objective tree for the Balkhu-Sanchal riverscape
(produced by the author, 2021)

6.1.4 Alternatives Analysis

The purpose of the alternatives analysis of LFA is to come up with possible alternative project ideas (NORAD, 1996). Looking at the previous stages of participation, problem, and objective analysis, I have come up with 2 distinct strategies:

- **Strategy 1:** is to **develop community-supported wastewater treating wetlands on both Balkhu and Sanchal sides** of the case study. Since the Sanchal side has a larger space available at its dispense (land demarcated as 'Shahid Memorial Park'), additional elements like "Ganesh sthan" temple, park landscaping, jogging and cycle tracks will be integrated with the wetland-generating possibility of positive socio-cultural activity.

- **Strategy 2:** is to **improve the connectivity and inclusive accessibility within the case study area, with a focus on non-mechanized commute.** To do so, the spaces underneath the bridge will be redeveloped and incorporated with green features as an extension to the green belts of the Bagmati corridor. Also, a new pedestrian bridge will be built to connect the 2 wetlands of Balkhu and Sanchal sides. This will be in the hopes of encouraging healthy interaction of the stakeholders with the riverscape, as well as within the various stakeholder groups. Connectivity and accessibility are pivotal in producing safe and inclusive spaces.

For the scope of this thesis, Strategy 1 will be classified as 'high priority' and will be dealt with more focus. This does not mean Strategy 2 is not of importance. Rather it is something that should and can be continued with, after the satisfactory achievement of Strategy 1. It is important to group projects under prioritized phases, so as to maintain the feasibility and practicality. Those are key features of an Urban Ecological Planning approach that advocates localized and attainable goals. It is cardinal to mention that both these strategies are not meant to disrupt the ongoing

Bagmati corridor project under the BRBIP- Bagmati River Basin Improvement Project. Instead, the aim is to capitalize on the positives of the progress made by BRBIP. In the past there has been visible issues when multiple projects/agencies with similar goals act in conflicting and counter-productive manner. The project strategy in no way should repeat this past mistake.

6.2 The Project Implications

6.2.1 Project Elements

This section will be dedicated to highlighting the various elements of the chosen Project Strategy (no. 1) (NORAD, 1996):

- **Goal:**

Creating a sustainable and community- supported riverscape environment of the Bagmati river watershed with its tribunary rivers. To this my project proposal only can contribute in part, making a Model Project for Wetland Treatment Plan.

- **Purpose:**

To develop a model project proposal that will ultimately lead to securing of limited public land for common good through Watershed Treatment Plants both at the riverscapes of Balkhu and Sanchal sides of the Bagmati river. These should be within the reach of the project but demands processes of cautious integrations.

- **Outputs:**

Strategy no. 1 has been chosen from section 6.1.4 as the high priority task. The project revolves around the focal component 'constructed wetlands' (CW), which is a natural pollutant filtration method. It basically comprises of a vegetative pit, into which the wastewater is directed (a suitable vegetation option for Nepal is 'Phragmites Karkaa'-

local reed). Once in the pit, the wastewater interacts with the wetland soil and vegetative roots; and indulges in the process of sedimentation and filtration. The result is an effluent that has decreased nitrogen and phosphorus, organic components that can also cause the eutrophication of rivers (Fig. 6-8) (Pandey. 2015). There are various types of constructed wetland models such as- Horizontal flow vs. vertical flow. Such optimum design technicalities require expertise beyond the scope of this thesis, and hence will not be

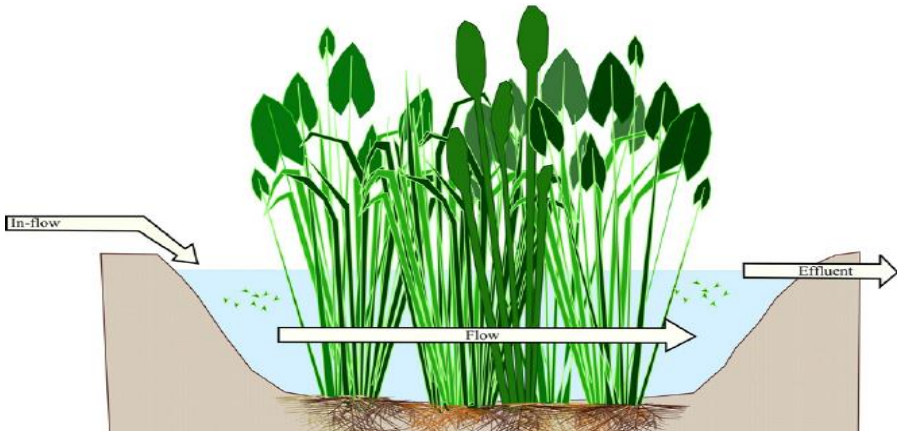


Figure 6-9 Constructed wetland system (White, 2013)

Figure 6-8 Pilot CW set up by Dr. Manoj Pandey in Kathmandu (Pandey, 2015)

discussed. The viability of the system in the Nepali context has already been tested by Dr. Manoj Pandey, as part of a PhD study- 'Constructed wetlands for wastewater treatment in Nepal, 2015). The model CW created had taken up approximately 240 sqm

of space, catering to 11.5 km of the Bagmati river (Pandey, 2015). As for the stretch of Balkhu-Sanchal riverscape- it is only approximately 0.6 km. This small-scale of Balkhu-Sanchal furthers the possibility of CW implementation.

Now it is time to dig a little deeper into the outputs. Instead of classifying the outputs as either 'green' or 'brown', we will discuss how they can be appealing to both the perspectives without causing an antagonistic dichotomy. They are as follows:

a. Constructed wetlands treatment plant on the Sanchal side:

The first major output is the creation of a constructed wetland (CW) treatment plant in the area demarcated as the "Shahid Memorial Park"- of which approximately 8,000 sqm. lies within our case study boundary (measured roughly on Google Earth). The use of the land for the treatment plan will not take away the opportunity of creating a proper park in the location. In fact, as per Dr. Manoj Pandey

> " constructed wetlands work very well when integrated in urban landscaping such as jogging tracks, flower gardens etc. The only gas produced is moderate amount of CH4 (Methane) which is odorless, so one will even notice the wastewater! All this is of course dependent on the regular maintenance of the system, like anything else."

Hence, the Park will be planned with subtle yet effective urban landscaping and amenities. A major attraction proposed will be a "Ganesh sthan" temple, to be located on the north of the Park. A small built-up already exists within the Park area, this will be repurposed as a clubhouse for casual gathering, or hosting events such as the acclaimed Bagmati river Festival.

While CWs are effective in dealing with household wastewater, the proposed CW is to only deal with the stormwater on the Sanchal side. This is because:

- Firstly, it will be extremely complicated and impractical to try and reform the existing sewage system. Instead, we put forward an UEP approach by aiming for the attainable goal of simply supporting (and not replacing) the existing conventional system.
- Secondly, the Sanchal households having typical multi-story dwellings have high water consumption rates, meaning high wastewater generation. DWs to treat that kind of volume would need land much greater than the one available.
- Thirdly, since only stormwater is being treated in the Sanchal side CW, the methane generated will be far lower. Instead, the vegetation will act as a CO2 sink. Hence a healthy and inviting environment is created.

As for dissecting the green and brown appeal-

- **'Brown' appeal:** It has already been mentioned that monsoon flooding is an issue on Sanchal side of the riverscape as well. Even if the water has not reached the residences yet due to their elevated positions, the flooding still hampers the riverbank. This is especially a concern for 'brown' advocates as now since the Bagmati corridor is being developed in full tandem, the footpath and roads are in extreme proximity to the river edge. As the construction process is progressing the river has not swelled, hence the problem has not gained attention. But the risk of flooding is inevitable. And for the choice of materials so far (stone boundaries walls, concrete block pavements, asphalt roads), their impermeable nature will only aggravate the situation. Hence in such a case the wetlands can attract the stormwater and allow a control over flooding and disrupting function through the corridor- hence catering to 'immediate brown' needs.

- **'Green' appeal:** While stormwater may not be the biggest polluter of the rivers, its tremendous amount (especially in monsoons) still adds to the pressure. More so in an area like Balkhu-Sanchal, where construction work seems to never stop,

the stormwater is bound to carry a lot of pollutants into the river if allowed. Hence the intermediate of the constructed wetlands will allow filtration of the water before improved the effluent gets discharged into the river. Over a long-run, the cleaner water discharged will help rejuvenate the hydrological balance. As for the integration of elements like landscaping, temples, event clubhouse, these help create a system of incremental social-cultural capacity. Slowly and steadily such activities build on a sense of responsibility and ownership, which presumably will motivate people to be part of the maintenance process. Thus, once again a 'long-term green' needs of sustaining a healthy riverscape is catered to.

b. Compact constructed wetlands treatment plant on the Balkhu side:

The second output is the creation of a constructed wetland (CW) treatment plant on the open 'dumping ground' of the Balkhu squatter settlement (marked in Fig.). The area is approximately 2500 sqm (measured roughly on Google Earth), which is visibly smaller than the one offered by the "Shahid Memorial Park". Unlike the Sanchal Constructed Wetland, the Balkhu CW will be specifically put in to treat the household wastewater of the Balkhu squatters. As of now they use communal tinned- toilets that are not connected to the city sewage network and hence discharges directly into the Bagmati river. Thus, part of the proposal is building proper hygienic communal toilets on the open 'dumping ground' and connect them to intercept into the CWs. Even though the area is smaller than in Sanchal, it could still be adequate due to the following assumptions:

- Firstly, even if the squatter settlement is dense, their supply of water is limited, meaning so is their consumption and waste generation.
- Also, the Balkhu side of the riverscape is much more degraded than the Sanchal side. Hence it will not be practical to propose the creation of an integrated park

in this case. Now without the need for integration of landscaping, the wetlands can be placed more densely (in comparison to on Sanchal side).

As for dissecting the green and brown appeal-

- **'Brown' appeal:** First and foremost, establishment of proper toilets is an indispensable necessity for the squatters. The current state of the toilets are extremely unsanitary and an open invitation to diseases and health risks. Hence the new toilets located away from direct contact of the river can uplift their living standard drastically. Additionally, flooding is an even bigger issue on the Balkhu side of the riverscape as the squatters dwellings are very close to the water edge. This brings in a lot of uncertainty, struggles and sanitation issues for them annually. Though the Balkhu constructed wetland may not be too large in size, it can still contribute in regulating the swelling water levels. Overall, for the above things to work, good maintenance is crucial. Hence, into the bargain, another 'brown' need can be fulfilled by employing the unemployed Balkhu squatters in the initial construction as well as maintenance of the toilets and wetlands. By involving them, an example can be set of their positive capacities. Their importance part in the process can be seen as an incentive to allow them to continue living in the riverscape (assuming they act responsibly and contribute in the well-being of the introduced changes). And since housing insecurity is their topmost concern (Rumba, 2014), the possibility of its end, could spark a sense of duty the place direly requires.

- **'Green' appeal:** The direct discharge of wastewater into the river is definitely one of the biggest 'green' concerns for the river's health. By providing the communal toilets away from the river, and connected to the wetlands, a huge burden of the river is reduced. This in longer -term can achieve decent margins of change. More so, the cleaner effluent discharged from the wetlands will help

rejuvenate the hydrological balance. And if sustained, the system of incorporating the squatters in the maintenance process, can capitalize on their numbers to clean the river regularly.

Figure 6-10 Land use demarcation showing the proposed interventions (adapted by the author from Google Earth, 2021)

- **Activities:**

The Outputs have been divided into 6 task groups – mapping, designing, financing, prepping, constructing and finally, sustaining. Each task group is further divided into a list of activities required to fulfill the task, and the stakeholders to be involved at each stage (Table: 6- 1):

Table 6-1 Work packages and Activities to describe the project (author)

S.N.	Work Package and Activities	Stakeholders involved
1.	**MAPPING**	
1.1	Survey the case study area and produce up to date Land-use maps	Ward offices
1.2	Map the existing public utility, and infrastructure (water pipes, sewer lines, electricity lines, roads)	Ward offices
1.3	Update the cadastral maps including Guthi property	DUDBC, KVDA, ward offices
1.4	Address land property papers and assist in solving disputes	Lumanti, Balkhu squatters, DUDBC
2.	**DESIGNING**	
2.1	Creating a trans- disciplinary team inclusive of representative from all stakeholder subgroups	The Ward offices, HPCIDBC
2.2	Organizing stakeholder meeting with design experts to get an inclusive design	Trans-disciplinary team, The Ward offices
2.3	Technical design and planning process for public toilets, constructed wetlands and landscaping	Technical experts: Engineers, planners, HPCIDBC
2.4	Continual process of improvement through feedback from stakeholders	Trans-disciplinary team, The Ward offices
2.5	Generate awareness and support throughout the process.	Local schools, colleges, Lumanti
2.6	Create detailed work schedule to be followed for efficiency and timely finish	Technical experts, The Ward offices, HPCIDBC

3.	**FINANCING**	
3.1	Create detailed budget required for finalized designs	Ward offices, Technical experts, HPCIDBC
3.2	Approach local private enterprises to support the project as part of Corporate Social Responsibility (CSR)	Trans-disciplinary team, Vayodha Hospital, HPCIDBC
3.3	Approach larger authorities and organizations to aid with partial financial support	HPCIDBC, NTNC, NRCT, KVDA
3.4	Introduce concept of employing local farmers as well as squatters to create a sustainable economic framework.	Balkhu squatters, Lumanti, NTNC, HPCIDBC
4.	**PREPPING**	
4.1	Clear out the waste disposed into the river and under the bridge	Save Bagmati Campaign, NRCT, Balkhu squatters, HPCIDBC
4.2	Cleaning the river should be a continual process. And the waste should be collected at a designated area responsibly, for future re-use/recycle etc.	HPCIDBC, Ward offices
4.3	Provide proper training to construction team. This will help gain more awareness and support regarding the project.	HPCIDBC, Ward Offices, Technical Experts, Lumanti, NTNC
4.4	Conduct baseline studies	IOE students, NTNC
5.	**CONSTRUCTING**	
5.1	Construct wetland for Sanchal side on “Shahid Memorial Park”	Technical experts, HPCIDBC, Balkhu squatter laborers
5.2	Integrate urban landscaping such as jogging paths, bicycle tracks, children play area, into the park	Technical experts, HPCIDBC, Ward offices
5.3	Build a “Ganesh sthan” at the north of the sanchal park and redevelop the existing park built-up into a small clubhouse.	Technical experts, HPCIDBC, Ward offices
5.4	Build communal toilets on the open ground of the Balkhu squatter settlement	Ward offices, DUDBC

5.5	Construct compact wetland on the Balkhu side as well, in the current open 'dumping ground'	Technical experts, HPCIDBC, Balkhu squatter laborers
6.	**SUSTAINING**	
6.1	Invite local school/colleges to use the Sanchal clubhouse, in return of helping with the maintenance	Trans-disciplinary team, local schools, IOE, Save Bagmati Campaign
6.2	Monitor the success/failure of project, and create new sustainable initiatives	IOE students, HPCIDBC
6.3	Invite the Bagmati River Festival to be hosted in the Park, and attract attention to the cause	NRCT, Save Bagmati Campaign, NTNC, local residents and businesses
6.4	Utilize the organic waste generated by the vegetable markets to produce compost for the Park plants, trees, vegetations etc.	Vegetable markets, Balkhu squatters, NTNC
6.5	Continue employment of squatters in further maintenance works	Balkhu squatters, Ward offices, HPCIDBC
6.6	Utilize local manpower to establish local market to prevent future encroachment of area	Local businesses, vegetable markets
6.7	Initiate plans for medium priority- Strategy 2 discussed in section 6.1.4 – building pedestrian bridge connecting Balkhu and Sanchal	Trans-disciplinary team, Ward Offices, HPCIDBC, DUDBC, KVDA

6.2.2 Project Matrix (PM): Assumptions and Indicators

Elements	Description	Assumption	Indicators
Goal	Creating a sustainable and community- supported riverscape environment	Strong support from governmental authorities like ward office for healthy completion of project	The project continues to thrive even after completion, without need of mandate
Purpose	Securing of limited public land for common good.	The land is available for use, and does not have any other projects planned on it	Proposal officially overseen by HPCIDBC, to be integrated with the ongoing BRBIP
Output	Constructed wetlands in Sanchal and Balkhu	Balkhu-Sanchal has enough land to create CWs.	Construction of wetlands that can cater to the demand well.
Activities	• Mapping	• Existing maps are accessible • Authorities cooperate with the process	• Timely update of all maps • Successful acquiring of land papers • Settling of any overlaps or disputes
	• Designing	• Designers have CW related expertise	• A design that does not compromise on either wastewater treatment facility, or feature of a park • Trans-disciplinary team has had chance to give feedbacks
	• Financing	• There is enough budget available	• Completion within budget • Transparent spending and listing
	• Prepping	• Stakeholders are willing to be part of the process	• Majority of stakeholders join the training and awareness programs

			• Local capacities like schools etc. volunteer readily. • Capacities are built for future use as well.
	• Constructing	• All resources are readily available	• Completion is done efficiently and on time • Squatters are employed through the process.
	• Sustaining	• Project has all components ready	• Project successfully encourages stakeholders to maintain and preserve • Does not need legal mandate for people to take up responsibility. • It becomes a thriving socio-cultural hub • It is inclusive and safe • Attracts more attention and support

Table 6-2 Project Matrix for the Balkhu-Sanchal wetlands proposal (author)

7 Summary and Conclusion

I started the first draft of my thesis by introducing the environmental and developmental issues of Bagmati river as wicked, unsolvable problems. This framework, at the outset, has challenged me on three fronts in addressing my case area, the Balkhu - Sanchal riverscapes of the Bagmati river.

First, I wanted to approach the rich history of Kathmandu valley and its main river through citizens positive 'images' and 'memories'. To approach this, I wanted to consult environmental psychology which addresses questions on ´how environments affect humans, what motivates people to act pro-environmentally, and how humans can be encouraged to establish and maintain a sustainable environment´ (L. Steg et al. 2011). How could a search into this be a constructive foundation for arguing for why and how to rejuvenate the river landscape and its cultural embeddedness?

I tried to explore this further, but my inability to involve in local social constructionist studies obstructed my desire. Brought forward through critical discourse analysis, citizens' diverse personal opinions would be a good eye opening learning exercise. However, I have included fragmented views of stakeholders (contacted by me through digital means from Norway and information gathered by my field assistants) which gives glimpses of citizens daily confrontations with situations which are mainly out of hand.

From the beginning of my master study, and the work on my thesis, I was concerned about research methodology and applied methods in the field to bring relevance to my studies and findings. An opportunity of local involvement through local participant observation studies would have been an excellent learning opportunity, which I indeed hope will return for future UEP students.

Secondly, my Urban Ecological Planning study has given me ´food for thought´ and skills for my future practice as an architect planner. I have learned that planning involves citizens lives and demand an ideological base of citizens' rights and duties in real participation. Contextual knowledge as locally understood needs to be brought forward, and the planner has to ask questions of 'who', 'what' and 'why'. But planning, and opinion making and mobilization by itself is not enough, planning efforts must address how to bring organized tangible results and local ownership towards sustainability of all citizens´ lives and common environment.

John Friedmann (2013) points out that there is ´a widespread acceptance that there are significant differences between theories that are used in planning and are specific to its several specializations (land use, transport, urban design, regional development, environmental planning, etc.); and theories that address what is common to all of them, i.e., theories of planning.´ In addition, Friedmann (2013) proposes a third category that he calls theories about planning. This is what some have called critical planning theories, which based on studies, take a critical look at planning as it is actually practiced.

I would suggest that Urban Ecological Planning in particular through an explorative local area based approach addresses theories about planning as practiced, but also theories of planning at local levels in search of relevance of specific, critical, and targeted areas of planning intervention for area upgrading.

Ayon Tarafdar (2009) in a context of ´brown´ and ´green agenda dichotomy´, highlights the general level differences of on the one side institutions responsible for ´green' policies and , on the other side, implementation bodies and communities responsible for ´brown´ sector implementation. The poor are blamed for being polluters, but the main volume of waste comes from the wealthy areas. The destiny of the marginalized is to live in polluted areas like at the riversides in Kathmandu.

My stakeholder interviews, and search for relevant references, also points to several high institutional and watershed level reports for Kathmandu valley and the Bagmati river which call for ´green agenda´ conservation objectives and plans. But local implementation is at best mainly left to incremental, insufficient, local action. In my case area no steps, to my knowledge, have been taken to work out detailed and locally agreed land-use plan, and divide responsibilities for its implementation to local government bodies, specialized gov. agencies and/or to dedicated Community Based Organizations (CBOs) and NGOs.

Third, from theory I ventured into to case study exploration. Essential for the good learning outcome of my case study was my ´scaling down´ to a limited area that is representative for parts of the riverscapes most exposed to uncontrolled land use change. My study was eye opening towards the effects of incremental change of the landscape and its characteristics. What was at 'edge' of the city did become integrated in the city through unplanned and unchecked land development mainly for housing.

However, also through mega projects like the Ring Road giving improved access but also converting agricultural land to urban use in the Kathmandu valley at a large scale. But in spite of this, there were, and still not are, any long term, approved and local applied land use conservation and development plans. To lay the foundation for long term plans for a ´green agenda´ of river and landscape rejuvenation was, and is, missing. ´Brown agenda´ infrastructure improvement interventions were, and are, ad hoc with limited local involvement and support.

As a result, I decided to try to bring forward what I discovered in my case study of the Balkhu - Sanchal area. I wanted to critically assess my ideas towards prioritized activities and outcomes. In my UEP course last semester I was introduced to project planning frameworks and methods which interested me. It is close to a synoptic planning process, starting with goal and purpose formulation. I don´t believe in an externally planned synoptic comprehensive planning processes in the liberal political

context in Nepal. For me, the Logical Framework Approach (NORAD, 1996) or Goal Oriented Planning Method, is first of all a beneficial tool in bringing forward stakeholder potentials and ownership in a participatory planning process. I am glad I gave priority to this as my last work effort for my master thesis. It has helped me to reach, and narrow down, a draft project ending with a strategic effort in bringing new knowledge of plant water purification with a double purpose of riverside land conservation and water quality improvement (Pandey, 2015).

However, I request the reader to carefully study my work package and activities proposal and table which gives detailed information on drafted activities. Here, I apply my knowledge on the special potentials of civil society, public, private and institutional stakeholders. I start with a mapping exercise which is much more than working out a base map. It is first my intention to involve the ward and build their responsibilities for public, common and private ownership relations. Working with Urban Development and Building Construction (DUDBC), the ward and municipal local government bodies, they get both municipal and national support in the endeavor. To secure common land resources of Guthi land is also essential.

Please take a second look at my table on Work Package and Activities proposal. Here a lot of my ideas and proposals are drafted also for design and financing, prepping, the constructing, and challenging goal to in part contribute to a long term green agenda with sustainability development goals. The prime project areas are the riverscapes first of Balkhu - Sanchal case area. But hopefully meaningful results could also create precedence that positive change is possible for the Bagmati watershed of the Kathmandu Valley.

I want to work for inclusiveness. I support efforts to involve marginalized citizens, the squatters, with employment for work related to constructed wetlands (CWs) . I have mentioned Lumanti, Support Group for Shelter, who specifically address disadvantaged Female Headed Households. And I want to propose to involve students

of Institute of Engineering in grounded community work in complex urban upgrading realities.

In conclusion, my ‘image’ for the Balkhu - Sanchal riverscape as a place of ‘wicked problems’ has turned into areas of potential. There is scope to also go beyond my case study area for building a better future for the Bagmati river. The strength is in the social capital of the civil society, and consciousness of the profound religious and cultural value and the positive image of Bagmati as part of the Himalayan rivers contributing to the Holy Ganga. Finally, I can say that there may be some hope in reliving the pleasant memories of Balkhu-Sanchal, however small.

Figure 7-1 Memory vs. Reality (author’s collection,2021)

8 References

Adhikari, B. (2018) ´The World Heritage Convention and human rights in Nepal: Lessons from the Asia Pacific and Global Arena´ ´In Larsen, Peter Bille (ed.) (2018) ´*World Heritage and Human Rights: Lessons from the Asia-Pacific and global arena* ´Earthscan Routledge, 2018) available at: https://www.researchgate.net/profile/Bipin-Adhikari-4

Ali (2015) *Green agenda vs brown agenda- conflict between developed and developing countries concerning about environmental aspects*. Available at: https://www.slideshare.net/maaz786/green-agenda-vs-brown-agenda (Accessed on: 10 April 2021).

Aryal, R. and Shrestha, A.B., (2011) *Climate change in Nepal and its impact on Himalayan glaciers. Reg Environmental Change 11, pp. 65–77*. [Online] Available at: https://doi.org/10.1007/s10113-010-0174-9 (Accessed on: 15 June 2021)

Asian Development Bank (2012) 'Nepal: Bagmati River Basin Improvement Project' Project Number: 43448, Concept paper

Australian Psychological Society (2020) *What is environmental psychology?* Available at: https://www.psychology.org.au/About-Us/What-we-do/advocacy/Advocacy-social-issues/Environment-climate-change-psychology/Psychology%E2%80%99s-role-in-environmental-issues/What-is-environmental-psychology (Accessed: 15 June 2021).

Bacon, F. (1853). Novum organum. *In The physical and metaphysical works of Lord Bacon* (Book 1). London: H. G. Bohn

Bajracharya, S. (2020) Kathmandu's rivers are becoming violent—and are gradually vanishing, The Kathmandu Post [Online] Available at: https://kathmandupost.com/valley/2020/01/11/kathmandu-s-rivers-are-becoming-violent-and-gradually-vanishing-1578668186 (Accessed on: May 25 2021)

Bakrania, S. (2015). *Urbanization and Urban growth in Nepal*, GSDRC Applied Knowledge Services. [Online] Available at: https://gsdrc.org/publications/urbanisation-and-urban-growth-in-nepal/ (Accessed on: 25 March 2021)

Basnyat, D.B., and Laitos, R.(2012) *Preparing the Bagmati River Basin Improvement Project Final Report: Stakeholder, Participation and Institutional Analysis, Prepared for Asian Development Bank*

Behrens, W.W., Meadows, D. L., Meadows, D, H., Randers, J. (1972) *The Limits of Growth.* [Online]. Available at: http://www.donellameadows.org/wp-content/userfiles/Limits-to-Growth-digital-scan-version.pdf (Accessed: 10 June 2021).

Bell, D and Jayne, M. (2009) *Small Cities? Towards a Research Agenda*, in International Joint of Urban and Regional Research 33(3):683-699 [Online] Available at: https://www.researchgate.net/publication/46541480_Small_Cities_Towards_a_Research_Agenda (Accessed on: 12 May 2021)

Benjaminsen, T.A. and Svarstad, H. (2019) 'Political Ecology', *Encyclopedia of Ecology*, 4(2), pp. 391-396. [Online] https://doi.org/10.1016/B978-0-12-409548-9.10608-6 (Accessed on: 20 June 2021).

Bignante, E. (2010) 'The use of phot-elicitation in field research', *EchoGeo*, 10. [Online] Available at: https://www.researchgate.net/publication/308374574_-_E_BIGNANTE_The_use_of_photo_elicitation_in_field_research_Exploring_Maa

sai_representation_and_use_of_natural_resources_EchoGeo_n_11_2010_En_ligne_URL_httpechogeorevuesorgindex11622html (Accessed on: 29 May 2021).

Bista, D. B. (1991) *Fatalism and Development. Nepal´s Struggle for Modernization.* Kolkata: Orient Longmans Private Limited.

Bjonness, H.C. and Corneil, J. (1998) 'Urban Ecological Planning and Revitalization: A new "Frame of mind" in planning education in developing countries', *Regional Development Dialogue*, 19(1), pp. 58-66.

Bjønness, H. C. *(2008) 'Changing Territorial Values in Urban Conservation. From Patan, Nepal, to Gyantse, Tibet Autonomous region', in Tomaszewski, A. (ed.) Values and Criteria in Heritage Conservation. Proceedings. Int. conference ICOMOS, Firenze 2007, Florence, Italy, March 2-4, 2007. Firenze: Edizioni Polistampa, pp. 133-143*

BRBIP (2021), Available at: https://www.brbip.gov.np/project-rationale.php

CBS (2021),Government of Nepal, National Planning Commission, https://cbs.gov.np/

Creswell, J. W. (1998) *Qualitative research and research design: Choosing among five traditions*. London: Thousand Oaks.

Dahal, A., Khanal, M., Ale, M. (2011) *Bagmati River Festival: Conservation of Degrading River*

Dangol, N. (2010) *SANA GUTHI AND THE NEWARS: Impacts of Modernization on Traditional Social Organizations*, M.Phil., thesis, University of Tromsø, Norway

DiCicco-Bloom, B. and Crabtree, B.F. (2006*)The qualitative research interview.* [online] https://doi.org/10.1111/j.1365-2929.2006.02418.x

DUDBC (2021) Available at:https://www.dudbc.gov.np/np/about-dudbc/goal-n-vision

Eraydin, Z. (2014) *The global image of the city: impacts of place branding on the image of Ankara*. Dr. Philosophy in city and regional planning. thesis. Middle East technical University [Online]. Available at: https://etd.lib.metu.edu.tr/upload/12618028/index.pdf (Accessed: 20 April 2021)

Erdős, L. (2019) 'Arne Naess and the Deep Ecology Movement', in: Springer, Cham. (ed.) *Green Heroes*. Pp 93-96. [Online]. Available at : https://link.springer.com/chapter/10.1007/978-3-030-31806-2_19 (Accessed on: 30 March 2021).

European Commission (2003) *'European Common Indicators. Towards a Local Sustainability Profile',* Ambiente, Institute of Research. Rome, December 2003. [Online] Available at: http://www.europa.eu.int/comm/environment/urban/pdf/eci_final_report.pdf (Accessed on: 02 April 2021)

Flyvbjerg, B. (2011) ´Case study´. In Denzin, N.K. and Lincoln Y. S. (eds.) The Sage Handbook for Qualitative Research. 4th Edition. Newbury Park, CA, US: Sage, Chapter 17, pp. 301-316 [Online] Available at: https://www.researchgate.net/profile/Bent_Flyvbjerg/publication/235953309_Case_Study/links/00463514b20a55cf69000000/Case-Study.pdf (Accessed on: 20 May 2021)

Friedmann, J. (2013) "Why Do Planning Theory?', In ´Acoustics, Speech, and Signal Processing Newsletter´, IEEE 2(1):7-10. 2013

Ghimire, R. (2019)-´Right to Housing as a Fundamental Right in Post-Earthquake Nepal: The Interplay of Municipal and International Law`. In National Judicial Academy, Nepal: *NJA Law Journal* . Volume 13. Number 1. 2019. Kathmandu.

Gibbons (2015) *Graham Haughton's principles of environmental equity*. Available at: http://www.writingcities.com/2015/02/24/environmental-justice-and-the-sustainable-city-graham-haughtons-principles-of-equity/ (Accessed on: 20 April 2021).

Gold, J.R. (2012) 'Kevin Lynch', in Hubbard, P. and Kitchin, K. (eds.) *Key Thinkers on Space and Place, second edition*, London: Sage, pp. 292-98. [Online] Available at: https://www.researchgate.net/publication/344071802_Kevin_Lynch (Accessed on: 17 June 2021)

Groeger, L. (2012) 'Making sense of the world, several senses at a Time- Sensory cross talk helps us navigate the world', *Scientific American*. [Online]. Available at : https://www.scientificamerican.com/article/making-sense-world-sveral-senses-at-time/ (Accessed : 12 December 2020).

Gurung, Dr. H. B. (1989) *Regional Patterns of Migration in Nepal*, Papers of the east-west population institute Hawaii, US.

Hamdi. N. and Reinhard, G. (1997) *Action Planning for Cities. A guide to community practice*, Chicheater, W. 1997

HPCIDBC (2021) Available at: https://bagmati.gov.np/en/

International Water Association (2021) Available at: https://iwa-network.org/

Igwenagu, C. (2016) *Fundamentals of research methodology and data collection* [Online]. Available at: https://www.researchgate.net/publication 303381524_Fundamentals_of_research_methodology_and_data_collection/citation/download (Accessed: 02 May 2021).

KAPRIMO (2007), Kathmandu Participatory River Monitoring- A Model for South Asia, Project Information Document

Karki, M. (2019) Lalitpur Metropolitan city profile- facts and statistics Available at: http://archive.nepalitimes.com/news.php?id=17329#.YNi9megzZPa

K.C, A. (2020) Spatial Changes in Kathmandu Valley: A review through political perspective . [Online] Available at: https://scholar.google.com/citations?user=oGHJ978AAAAJ&hl=ja (Accessed on: 10 June 2021)

Khadge, S and Tiwari, S.R. (2014) *Conservation of Water Heritage in Kathmandu Metropolitan City,* in Proceedings of IOE Graduate Conference, pp. 452-460

Kono N. (2014) Brundtland Commission (World Commission on Environment and Development). In: Michalos A.C. (eds) Encyclopedia of Quality of Life and Well-Being Research. Springer, Dordrecht. [Online] Available at: https://link.springer.com/referenceworkentry/10.1007%2F978-94-007-0753-5_441 (Accessed on: 20 April 2021)

KVDA (2021) Available at: http://www.kvda.gov.np/

Lewis-Beck, M., Bryman, A. & Futing, L. (2004) The SAGE Encyclopedia of Social Science Research Methods.

Lexico (2021) Available at: https://www.lexico.com/definition/rejuvenation (Accessed on: 15 June 2021).

Lipp, W. (2011) 'Imago- Image- Imagine: sketches for a Mind Map', in Giometti, S. and Tomaszewski, A. (eds) *International Conference of the ICOMOS International Scientific Committee for the Theory and the Philosophy of Conservation and Restoration, Florence, Italy, March 6-8, 2009*: Edizioni Polistampa, pp. 25-32.

Lumanti (20210 Available at: http://lumanti.org.np/

Madsen, P. (2016) *Deep Ecology*. Available at: https://www.britannica.com/topic/deep-ecology (Accessed 05 April 2021).

Mahaseth, T. (2017), *Social Exclusion: Single Women's Struggle for Housing and Livelihoods, Case Study: Informal Settlement of Manohara in Kathmandu Valley, Nepal*, Master's Thesis in Urban Ecological Planning, Norwegian University of Science and Technology

Merriam- Webster (2021) Available at: https://www.merriam-webster.com/ (Accessed: 16 April 2021).

McCombes, S. (2019) *How to write a literature review.* Available at: https://www.scribbr.com/dissertation/literature-review/ (Accessed on: 28 May 2021)

McGranahan, G, and Satterthwaite, D (2000) ´Environmental health or ecological sustainability? Reconciling the green and brown agendas in urban development´. In Pugh, C (ed.), Sustainable Cities in Developing Countries. pp 76 - 99. London: Earthscan

McNeil, K. (2012) *Engaging middle schoolers with sustainable development goals*. Available at: https://blog.entrepreneurship.asu.edu/2021/04/20/engaging-middle-schoolers-with-sustainable-development-goals/ (Accessed 19 June 2021).

Moffat, Tina and Finnis, Elisabeth (2005)- Considering social and material resources: the political ecology of a peri-urban squatter community in Nepal. Published by Habitat International 29 (2005) 453 - 468

Nasar J.L. (1998) *The Evaluative Image of the City*, SAGE Publications, Incorporated

Nepal, U. (2013) *Social acceptance of community based DEWATS- A case from two urban communities of Madhyapur Thimi municipality of Nepal*, MSc. Urban Ecological Planning, thesis, Norwegian University of Science and Technology, Trondheim, Norway

Nepali Sansar (2018) 21 percent of Nepal Population under Poverty line, https://www.nepalisansar.com/news/21-percent-of-nepal-population-under-poverty-line/

Nepali Times (2010) 'Take me to the river', [online] Available at: http://archive.nepalitimes.com/news.php?id=17329#.YNi9megzZPa (Accessed on: 05 May 2021)

NEST (2010) *Physical Mapping of the Squatter Settlements situated along the Bagmati River Corridor (East-West) in the Kathmandu Valley Report, Volume 1*, Government of Nepal, Ministry of Physical Planning & Works, Department of Urban Development and Building Construction (DUDBC), Babar Mahal, Kathmandu

Neutel, S. (2017) *The Concept of Nudging in Landscape Architecture and Planning: Understanding Nonconscious Human-Environment Interaction in a Natural Context.* MSc. Cultural Geography. Thesis. Wageningen University [Online]. Available at: https://edepot.wur.nl/412229 (Accessed on: 30 June 2021)

NPC (2021) Available at: https://www.npc.gov.np/en

NORAD (1996) *Logical Framework Approach (LFA). Handbook for objectives-oriented planning*. Third edition. Oslo: Norwegian Agency for Development Cooperation.

NRCT (2021) Available at: http://www.nrct.org.np/

NTNC (2009) Bagmati Action Plan (2009–2014). Kathmandu, Nepal.

NTNC (2021) Available at: https://ntnc.org.np/

Ojha, A. (2020) 'People seem to be disregarding the seriousness of the issue', in 'The Kathmandu Post', [Online] Available at: https://kathmandupost.com/interviews/2020/08/14/people-seem-to-be-disregarding-the-seriousness-of-the-issue (accessed on: 13 June 2021)

Oxford Languages (2021) Available at: https://languages.oup.com/ (Accessed: 16 April 2021).

Oxford learner's dictionary (2021) Available at: https://www.oxfordlearnersdictionaries.com/definition/american_english/sample_1 (Accessed on: 02 June 2021)

Pandey, Dr. M.K. (2015) Constructed wetlands for wastewater treatment in Nepal, PhD degree – Trial Lecture and Public Defense, Department of Environmental Sciences, Norwegian University of Life Sciences (NMBU)

Pant, P.R. and Dangol. D. (2009) *Kathmandu valley profile workshop 11-13*

Platman, L. (2014) *From Holy to Holistic: Working Towards Integrated Management of the Bagmati River Corridor*, Independent Study Project (ISP) Collection. 1808.[Online] Available at: https://digitalcollections.sit.edu/isp_collection/1808 (Accessed on: 12 May 2021)

Quay, C. (2020) *10 Characteristics of Wicked Problem.* Available at: https://medium.com/problem-solving-blog/how-to-identify-a-wicked-problem-d12c08a77a59 (Accessed on: 28 March 2021).

Rangahau (2020) Available at: http://www.rangahau.co.nz/exemplar/146/ (Accessed on: 10 May 2021).

Robson C (2002) Real World Research. Blackwell, (2nd edition)

Rumba, R. (2014) Balkhu settlement in Kathmandu: a poor neighborhood, Situation Analysis, Bachelor of Social Services (UAS), thesis, Diaconia University of Applied Sciences, Helsinki, Finland

Schuemann, K. B. (2014). *A phenomenological study into how students experience and understand the university presidency*. [Online] Available at: https://scholarworks.wmich.edu/dissertations/261/ (Accessed on: 28 May 2021)

Shakya, G. (2011) *Towards Revitalizing Bagmati*. M.Sc. Urban Ecological Planning, thesis. Norwegian University of Science and Technology

Shrestha, P. (2015) New Imperialism and the emergence of three squatter settlements-understanding the emergence of three squatter settlements within a critical Marxist framework. Unpublished paper

Shrestha, P. (2019) Mainstreaming the ´Brown´ Agenda. Published by Sustainability 2019, 11(23), 6660; https://doi.org/10.3390/su11236660

Shukla, T.K. (2015) *"From Occupied to Legitimized": Role of Social Capital in Legitimization of Land- case of Squatter Settlements in Kathmandu, Nepal*, MSc. Thesis in Urban Ecological Planning. Norwegian University of Science and Technology

Singh, S. (2015) *Ecocity elements in the traditional settlement Kirtipur of Kathmandu valley.* [Online]. Available at: https://www.researchgate.net/publication/281776358_Ecocity_elements_in_the_traditional_settlement_Kirtipur_of_Kathmandu_valley (Accessed: 2 April 2021).

Singh, S. and Tiwari, S. R. (2016) 'Eco-city and Other Ecological Approaches in Urban Planning: A Review of the State-of-the-Art', in *Proceedings of IOE Graduate Conference, Kathmandu, Nepal, 2016*. Institute of Engineering, Tribhuvan University, pp. 253–263

Smolenska, S. (2011) '*Mind manipulation by mass-media using city images in newspapers'*, in Giometti, S. and Tomaszewski, A. (eds) *International Conference of the ICOMOS International Scientific Committee for the Theory and the Philosophy of Conservation and Restoration, Florence, Italy, March 6-8, 2009*: Edizioni Polistampa, pp. 25-32.

Steg, L., Van den Berg, A. E., & de Groot, J. I. M. (eds.). (2013) - Environmental psychology: An introduction. Oxford: Wiley - Blackwell.

Statista (2021) *Share of rural population in Nepal from 2010-2019.* https://www.statista.com/statistics/761008/nepal-share-of-rural-population/

Stony Brook university (2021) Available at: https://www.stonybrook.edu/commcms/wicked-problem/about/What-is-a-wicked-problem (Accessed on: 10 May 2021).

Tarafdar, A. (2009) 'Critical Reflections on the Relations between Sustainability, Urban Environmental Challenges, and Livelihood Issues at a Local Scale. Case Study: Fringe areas of Kolkata, India', Published in Full Paper Proceedings - 11th International Conference on Humane Habitat (ICHH) 2009, Mumbai, India, January 29-31, 2009. Mumbai: Rizvi Publications, (ISBN 87-217-0370-7).

Tarafdar, A. (2010) Bridging the Dichotomy. Exploring Linkages between Urban Environmental Challenges and Local Development Practices in the Neighborhoods of Kolkata, India. Doctural thesis. Norwegian University of Science and technology.

Thakur, N. and Bjønness, H. C. *(2001), ´Understanding Boundaries of Difference in Efforts of Cultural Continuity' in 3rd International symposium on "De-placing Difference, Architecture, Culture, and Imaginative Geography", Centre for Asian and Middle Eastern Architecture 2001*, Adelaide, South Australia, July 4-6, 2001. Adelaide University.

Thapa, R. and Murayama, Y. (2010), *Drivers of urban growth in the Kathmandu Valley, Nepal: Examining the efficacy of the analytic hierarchy process*, in Applied geography. Available at: DO - 10.1016/j.apgeog.2009.10.002

Tiwari, S.R. (2008) *City Space and Life then, 150 years ago-A presentation of concept and realities, V20150*, Vedic Udbodhan, Available at: http://www. kailashkut. com/City% 20Space% 20and% 20Life

Tiwari, S.R. (1999) *Kathmandu Valley Urban Capital Region and Historical Urbanism Historical Environment Management: Lessons from History, in* 13th Biennial Conference of Association of Development Research and Training Institutes of Asia and the Pacific (ADIPA) – V29, Bangkok, Thailand

Tiwari, S.R, Shrestha, P., Bjonness, H.C. (2018) Local rights in World Heritage Sites: Learning from post-earthquake rehabilitation dynamics in the Kathmandu Valley, in World Heritage And Human Rights- 1st Edition,First Published 2017, Imprint Routledge, eBook ISBN9781315402789

Tol, R. S. J. (2006) The Stern review of the economics of climate change: a comment [Online]. Available at:

https://www.researchgate.net/publication/221678851_The_Stern_Review_of_the_Economics_of_Climate_Change_A_Comment (Accessed on: 30 March 2021).

Topcu, K. D. and Topcu, M. (2012) 'Visual presentation of mental images in urban design education: cognitive maps', *Procedia - Social and Behavioral Sciences*, 51 (2012),pp. 573-582. [Online] Available at: https://www.sciencedirect.com/science/article/pii/S1877042812033460 *(Accessed: 22 June 2021)*

UNESCO (2021) https://en.unesco.org/fieldoffice/kathmandu

United Nations (1995) *'Draft Statement of Principles and Global Plan of Action- the Habitat agenda: report of the Secretary-General of the Conference'*, in *United Nations Conference on Human Settlements (HABITAT II)*, Nairobi, Kenya, March 13, 1995. [Online] Available at: https://digitallibrary.un.org/record/205663?ln=en (Accessed on: 02 April 2021)

United Nations (2021) Available at: https://sdgs.un.org/goals (Accessed: 18 June 2021)

Vayodha (20210, Available at: https://www.vayodhahospitals.com/

Wikipedia (20210 Available at: https://www.wikipedia.org/

*World Bank (*2021) Nepal Overview, *The World Bank group, https://www.worldbank.org/en/country/nepal/overview*

*Worldometer (*2021) Nepal Population (live) https://www.worldometers.info/world-population/nepal-population/

Yin, R. K. (1994) Case Study Research: Design and Methods. London / Delhi: Sage Publications.

Annex 1: List of involved organizations based on initial literature review

The following list of involved organizations was created based purely on the mentions made during the literature review. The list is accompanied by the digital contact address where contact request was sent. Final contact was made with only a few (mentioned in Annex- 2).

Name	**Contact**
Governmental Organizations	
DUDBC: Department of Urban Development and Building Construction	ktmdivision@gmail.com
Bagmati Basin Water Management Strategy and Investment Program	pd.brbip@yahoo.com
High-Powered Committee for Integrated Development of the Bagmati Civilization (HPCIDBC) – earlier BASP	hpcidbcoffice@gmail.com
Bagmati Integrated Watershed Management Program (BIWM), which was initiated by the Department of Soil Conservation and Watershed Management	nationalportal@nitc.gov.np
Kathmandu valley town development Authority (KVTDA)	
UN Park Development Committee	
Non-Governmental Organization/ Individuals	
Bagmati Sewa Samittee	

NTNC: Nepal trust for nature conservation – Dr Sidharth Bajracharya (executive director)	info@ntnc.org.np
Save the Bagmati campaign, Mr. Bikesh Shrestha	https://www.facebook.com/groups/baaghmati
ENPHO – Environment and Public Health Organization – DEWATS,	enpho@enpho.org , https://www.facebook.com/Environment-and-Public-Health-OrganizationENPHO-508447009174268
Pro Public	propulbic@gmail.com https://www.facebook.com/Forum-for-Protection-of-Public-Interest-Pro-Public-1642804209301449/
Women's environmental preservation committee (WEPCO)	wepco@ntc.net.np https://www.facebook.com/wepco/
Lumanti Lajana Manandhar, Executive Director Sumitra Gurung General member	shelter@lumanti.org.np lajana@lumanti.org.np sumitram@mos.com.np
NRCT: Nepal river Conservation trust - Bagmati river festival, founder – Megh Bahadur Ale	info@nrct.org.np , shttps://www.facebook.com/nepalriverconservationtrust
ISET- Nepal, The Institute for Social and Environmental Transition–International	https://www.facebook.com/ISETInternational/

FOB: Friends of Bagmati	www.friendsofthebagmati.org.np info@friendsofthebagmati.org.np
Global Peace Foundation (GPF)	nepal@globalpeace.org https://www.facebook.com/gpfnepal/posts/river-of-peace-campaign-an-environmental-initiative-of-global-peace-foundation-i/3930776870294230/
Bagmati cleanup Mega campaign	
NWC: Nepal Water conservation	info@nwcf.org.np
Green Team Nepal	https://www.facebook.com/greenteamnepal/
Alok Sidhi Tuladhar – river culture, heritage activist,	

Annex 2: List of resource persons and interviewees

The following list is based upon the people with whom final contact was made, either through a thorough interview, or through exchange of emails for sharing of information. The amount and type of information shared varied due to the uncertain and difficult atmosphere created by COVID-19 in Nepal. It includes individuals beyond the list in annex-2, as they came into notice through personal and professional contacts.

Contact person	**Type of contact**
Resource persons, Experts, Academics	
Dr. Manoj Pandey, Senior Advisor, Faculty of Environmental Science and Nature Management, NMBU	key informant, thorough zoom interview
Mr. Gyanendra Shakya, Architect, UEP Alumni	key informant, thorough zoom interview
Mr. Bikesh Shrestha, Save Bagmati Campaign, activist	thorough zoom interview
Dr. Pranita Shrestha, Research Associate, The University of Sydney School of Architecture, Design and Planning, UEP Alumni	email exchanges
Ms. Lajana Manandhar, Executive director, Lumanti	email exchanges
Dr. Sumitra Gurung, General Member, Lumanti	email exchanges
Dr. Siddhartha Bajracharya, Executive Director, NTNC	email exchanges
Mr. Sanjay Adhikari, Pro Public	email exchanges

Residents	
Mr. Anup* Baral, resident of Sanchal , head of the Baral household	Thorough interview answers sent through voice notes
Dr. Niva* Baral, resident of Sanchal, daughter to Mr. Anup Baral, young practicing doctor	Thorough interview answers sent through voice notes
Mr. Manish* Lal Shrestha, resident of Sanchal, Businessman, head of the Shrestha household	Thorough zoom interview
Mrs. Renu* Shrestha, resident of Sanchal, wife to Mr. Manish Lal Shrestha	Thorough zoom interview
Mrs. Neha* Shrestha, resident of Sanchal, daughter to Mrs. Renu* Shrestha and Mr. Manish* Lal Shrestha, young businesswoman	Thorough zoom interview
Ms. Asmita* Bajracharya, resident of Sanchal, young journalist	Thorough interview answers through written notes
Mr. Brajesh* Adhikari, resident of Sanchal, Engineer	Interview answers sent through voice notes
Ms. Sneha* Adhikari, university student, daughter to Mr. Brajesh Adhikari	Interview through zoom call
Mrs. Pushpa* Dhaubhadel, resident of Sanchal, office worker	Interview answers sent through voice notes
Mrs. Sarojini* Bajracharya, resident of Sanchal, social worker	Thorough zoom call interview
Ms. Rupa* Sharma, resident of Sanchal, university student	Thorough zoom call interview

* names have been altered for the privacy and comfort of the interviewees

Annex 3: Interview guide: Balkhu-Sanchal residents

1. Please state your full name
2. How long have you lived in the Kathmandu valley?
3. How long have you lived near the Balkhu- Sanchal riverscape?
4. What led you to the choice of living near the Balkhu- Sanchal riverscape?
5. Please describe what was Bagmati riverscape like before vs. what it is like right now.
6. Have you interacted with the Bagmati river in any way? Please describe.
7. Have you seen the river being used religiously or culturally? Anything specific to the Balkhu-Sanchal riverside?
8. What are the projects you know of- that were done/ are being done for improvement of the river? And what are your thoughts on its success/failure?
9. Have any of the projects been implemented/ targeted at the Balkhu-Sanchal area?
10. What are you views on the riverside squatter/slum issue?
11. Has the proximity to the ring road, and Kalanki (valley's vehicular entry/exit pt.) affected the Balkhu riverscape? If yes, please describe how?
12. What are your thoughts on the UN park in Jwagal? Should and can something similar be done in Balkhu- Sanchal riverscape?
13. What are your thoughts on the "Shahid memorial Park" in Balkhu-Sanchal area?
14. Do you have suggestions for improvement of the riverscape?
15. Do you have any old or new pictures of the Bagmati river that you would be comfortable sharing? This is for the author to create a photographic timeline to see the transformation of the river over the years. (All identifiable faces will be blurred for privacy reasons).

Annex 4: Interview guide: Resource persons, key informants

1. What is your name?
2. What is your age?
3. What is the organization you are affiliated with? And what is your position in it?
4. How long have you lived in the Kathmandu valley? And which locality do you belong to?
5. Please describe what was Bagmati riverscape like before vs. what it is like right now.
6. Have you interacted with the Bagmati river in any way? Please describe.
7. Have you seen the river being used religiously or culturally? Anything specific to the Balkhu riverside?
8. What are the projects you/ your organization have been involved in that were done/ are being done for improvement of the river?
9. And what are your thoughts on your various projects' success/failure?
10. Have any of the projects been implemented/ targeted at the Balkhu-Sanchal riverscape? Any specific problems you faced there?
11. Thoughts on other Bagmati-related projects?
12. What are you views on the riverside squatter/slum issue?
13. What are your thoughts on the UN park in Jwagal?
14. Do you have suggestions for improvement of the betterment of the riverscape?
15. Do you have any old or new pictures of the Bagmati river that you would be comfortable sharing? This is for the author to create a photographic timeline to see the transformation of the river over the years. (All identifiable faces will be blurred for privacy reasons).

Annex 5: Thesis workshop with Prof. Hans Christie Bjonness: Logical Framework Approach

The workshop was conducted in June 2021 between the researcher- Ms. Alvira Shrestha and thesis supervisor– Prof. Hans Christie Bjonness. The purpose was to discuss and brainstorm proposal ideas with the help of the Logical Framework Approach (LFA) (NORAD, 1996).

NTNU

Kunnskap for en bedre verden