

# UC Santa Cruz

## UC Santa Cruz Electronic Theses and Dissertations

### Title

Inter-Basin Transfers, Ancient Ingenuity, Water Justice? Assessing the Impacts of the Melamchi Water Supply Project in the Kathmandu Valley, Nepal

### Permalink

<https://escholarship.org/uc/item/29f8244f>

### Author

Sepaniak, Stephen Andrew

### Publication Date

2021

### Copyright Information

This work is made available under the terms of a Creative Commons Attribution License, available at <https://creativecommons.org/licenses/by/4.0/>

Peer reviewed|Thesis/dissertation

UNIVERSITY OF CALIFORNIA  
SANTA CRUZ

**Inter-basin transfers, ancient ingenuity, water justice? Assessing the impacts of the  
Melamchi Water Supply Project in the Kathmandu Valley, Nepal.**

**Stephen A. Sepaniak**

June 2021

The Dissertation of Stephen A. Sepaniak is  
approved:

---

Professor Chris Benner, Chair

---

Professor Hiroshi Fukurai

---

Ruth Langridge, PhD

---

Quentin Williams  
Acting Vice Provost, Dean of Graduate Studies



## **Table of Contents**

### **Introduction:**

<i>Situating context: research questions</i>	1
<i>Literature review</i>	5
<i>Methodology</i>	27
<i>Overview of Melamchi Water Supply Project (MWSP)</i>	32
<i>Social and demographic characteristics of study area</i>	39
<i>Overview of dissertation</i>	44

### **Chapter 1: Indigenous water systems and social relations in the Kathmandu Valley: A critical social and political history**

<i>Overview of chapter</i>	52
<i>Indigenous ingenuity, external influences: ancient water systems of Kathmandu</i>	60
<i>Social relations, inequalities and water infrastructure: a brief history</i>	87
<i>Social transformations and infrastructure: transition toward a unified Nepal</i>	98
<i>Stratification in unified Nepal: European influences and codification of inequalities</i>	105

### **Chapter 2: Daily water practices and micro-politics of household access in Kathmandu: An ethnographic approach**

<i>Overview of chapter</i>	133
<i>Urban households with piped municipal water access</i>	139
<i>Whither hiti?: Traditional water systems in dense urban neighborhoods</i>	158
<i>Daily water practices in an urban squatter community: Geography &amp; informality</i>	163
<i>Peri-urbanization: Household water practices beyond the urban core</i>	178
<i>Ancient infrastructure restoration and groundwater recharge</i>	200
<i>Informal water economies: tanker drivers, livelihoods and water security</i>	208

<b>Chapter 3: Elite-driven infrastructure planning: Melamchi water, political change and pressures from above and below</b>	
<i>Overview of chapter</i>	224
<i>Searching for supplemental water: Scarcity in a growing metropolis</i>	229
<i>Revolution, democracy and market reforms: A renewed focus on urban infrastructure</i>	241
<i>Structural adjustments meet Maoist movements: Political conflict and the MWSP</i>	249
<i>Peace, democracy, an earthquake and the diversion of Melamchi water</i>	272
<i>Between past and future: Waiting for Melamchi</i>	285
<i>Drilling tunnels, capping dissent: A turn toward China and geopolitical implications</i>	298
<b>Conclusion</b>	
<i>Review of findings / follow-up with core research participants</i>	321
<i>Paths that lead forward: directions for subsequent research and equity</i>	334
<b>Works Cited</b>	347

## List of Figures

### Introduction

Figure 0.1: Phase I and Phase II (proposed) of Melamchi-Kathmandu tunnels	34
Figure 0.2: Wards of Kathmandu Valley to be served by imported Melamchi water	37
Figure 0.3: Administrative districts of the Kathmandu Valley	40

### Chapter 1:

Figure 1.1: Water flows from an ancient <i>hiti</i> , or public tap in Kathmandu	60
Figure 1.2: Major language families of South Asia	65
Figure 1.3: Schematic of an ancient water system of the Kathmandu Valley	67
Figure 1.4: Photo of <i>Manga Hiti</i> : Oldest public tap still in use in Kathmandu Valley	70
Figure 1.5: Map depicting <i>Kirata</i> lands, as described in epic <i>Mahabharata</i>	74
Figure 1.6: Timeline of key events in Kathmandu prior to Nepalese unification (1769)	76
Figure 1.7: Photo of surviving <i>rajkulo</i> canal system	79
Figure 1.8: Map of contested territories between Nepal and India	112
Figure 1.9: Table of five, hierarchical status categories of <i>Muluki Ain</i> of 1854	120

### Chapter 2:

Figure 2.1: Map of Kathmandu Valley depicting sites of ethnographic fieldwork	137
Figure 2.2: Photo of dense urban neighborhood with piped water access	141
Figure 2.3: Photo of area where interviews with homeowners were conducted	150
Figure 2.4: Large water storage tanks line the rooftops of many houses	155
Figure 2.5: Residents of Bhaktapur collect water from ancient <i>hiti</i>	160
Figure 2.6: Areas with unregistered housing remain excluded from piped network	166
Figure 2.7: Map of urban/peri-urban boundaries in Kathmandu Valley districts	179
Figure 2.8: Map of Mahalaxmi Rural Municipality – field site	182
Figure 2.9: Photo of community wells in peri-urban Mahalaxmi	186
Figure 2.10: Map of existing and planned ring-roads in Kathmandu Valley	195
Figure 2.11: Before and after photo of ancient pond restoration	200
Figure 2.12: Photo of a tanker delivery during participant-observation	211

## **Abstract**

*Inter-basin transfers, ancient ingenuity, water justice?: Assessing the impacts of the Melamchi Water Supply Project in the Kathmandu Valley, Nepal.*

By Stephen A. Sepaniak

This research examines equity and justice impacts of inter-basin water transfers and urban water provision in the Kathmandu Valley of Nepal, providing new insights into how ancient water technologies and contemporary infrastructure projects not only can co-exist, but can also provide additional layers of household water security against the specter of a changing climate. Excavating the deep and hidden histories of the Kathmandu Valley's native water systems illuminates how development is and can be much broader and more expansive than a mere transition toward industrial modernity, emphasizing instead the multiplicity of pathways that can create the enabling conditions for human societies to lives of meaning and value. Moving from water transfers toward greater water justice, however, will require a more wide-ranging, multi-faceted approach to water provision, one that better links new infrastructure projects with existing dimensions and networks of water use and where a wider range of voices are heard and respected. This research draws on ethnographic interviews, critical social histories and a polymorphous approach toward investigating (geo)political actors to illuminate the challenges of implementing new water mega-projects, while also emphasizing how the existence of multiple modes of water access and diverse forms of governance carries the potential to achieve greater water equity and justice.

## **Acknowledgments:**

### *In Memory of Ben Crow (1947-2019)*

I cannot express enough gratitude and thanks to my late adviser and mentor, Professor Ben Crow, who expressed steadfast support for my work and encouraged me strongly to pursue international research on questions of water justice and development. I will never forget his willingness to chat on the phone anytime of the day, or from anywhere in the world, to discuss big picture issues related to my research, nor will I forget his tireless advocacy for his students and all those who participated in his research.

I am also deeply grateful for the advice and wisdom of my dissertation reading committee: Professor Chris Benner generously filled the role of committee chair during the last couple years of this research, assisting me in transforming my writing into a (hopefully) more polished final product; Dr. Ruth Langridge also played a pivotal role in helping me articulate the broader contributions of this work more clearly; Professor Hiroshi Fukurai also served as an invaluable participant on the committee, not only aiding me in completing the work, but also introducing me to further contacts in the field. I also want to thank the Sociology Department at the University of California-Santa Cruz, more generally, for their support and their patience throughout the scope of this fieldwork.

This research would not have been possible without the support and sponsorship of numerous faculty and staff at Tribhuvan University in Kirtipur, Nepal. I am especially grateful to the staff at the Centre for International Relations at Tribhuvan University, including Vinod and all of the office staff who assisted with their time and energy in guiding me through the process of applying for a Nepal Study Visa to conduct independent research, not once, but



twice during the fieldwork period. I am also especially grateful to Dr. Mrigendra Bahadur Karki at the Centre for Nepali and Asian Studies (CNAS) at Tribhuvan University for his support in reading my research proposals and guiding me through the process of turning my plans into action. I want to thank further the numerous other faculty, staff and students at Tribhuvan University who assisted me in conducting this research.

This fieldwork would not have come to fruition were it not for the countless friends and contacts in Nepal who assisted with the research, participated in interviews, and helped me arrange housing and contacts. In particular, Dhiren, Lopsang, Sunita, Bhoj Raj, Maya, Vinayak, Kumar, Sonam, Faisal, Ram, Suresh, Kabi and Ramesh all were indispensable for their roles in ensuring I had everything I needed to carry out the fieldwork and for their assistance in introducing me to a wider network of contacts. Finally, I want to thank the much wider group of people who participated in the research, many of whom will remain anonymous for the purposes of this public work.

Finally, I want to thank everyone in my family for their support in encouraging me to pursue my dreams throughout the years. This work is only possible because of all of you.

*Inter-basin transfers, ancient ingenuity, water justice? Assessing the impacts of the Melamchi Water Supply Project in the Kathmandu Valley, Nepal*



### *Situating Melamchi in a Geopolitical Context*

The 2010 recognition of a fundamental human right to safe water by the United Nations (UN) General Assembly and the UN Human Rights Council (UNHRC) has prompted many governments and Non-Governmental Organizations (NGOs) worldwide to take decisive action in planning and implementing new water delivery systems (Murthy 2013). Achieving such goals often requires the support of global lending organizations such as the World Bank, and Asian Development Bank (ADB) to provide financing for water infrastructure projects. Initiatives financed by global organizations have often played a major role in enhancing urban water provision in some of the world's fastest growing cities, yet these same organizations are also sometimes the subject of criticism for their role in perpetuating inequalities, both between and within states (Bakker 2007). Recent research has expanded understandings of how water rights are implemented, illuminating how the delivery and distribution of water is always embedded in, and specific to, local histories and socio-cultural contexts (Bakker 2013; Boelens et. al 2016; Zwartveen and Boelens 2014). What works in achieving improved access to water in one locale will not necessarily work in another. In addition, a broad consensus of social scientists emphasize the need to situate new development initiatives within a broader relational context that takes into account and interrogates seriously longstanding inequalities and power relations that have been shaped by centuries of history (Boelens 2013; Mosse 2010; Murthy 2013).

The Melamchi Water Supply Project (MWSP), an inter-basin water transfer in Nepal, exemplifies these challenges. The Government of Nepal has recently enshrined the human right to water into its (2015) constitution with Article 35, Section 4 explicitly stating, “every citizen shall have the right of access to clean drinking water and sanitation” (Constitution of Nepal 2015). Nonetheless, Nepal has a long history of public water provision with the Kathmandu Valley serving as the site of an ancient and enduring urban civilization whose indigenous water technologies continue to provide a viable source of domestic household water to this day. To address and expand upon gaps in the literature on global water justice and governance, I trace the long, tortuous history of elite-driven water planning in Bagmati Province, Nepal to examine how the inter-play between geopolitics, grassroots resistance and political change shapes and constrains pathways for water infrastructure development to meet basic human needs and rights. Recent government efforts to fund and expand water infrastructure in Nepal have been shaped by Nepal’s categorization as a Least Developed Country (LDC) by international lending organizations, such as the World Bank and the ADB, with the former abandoning support for the MWSP back in 2002 after already pledging to provide financing (ADB 2008; Khadka and Khanal 2008). For lower-income countries, like Nepal, this means that the expansion of water rights can be best understood through a framework of progressive realization – in other words, governments and NGOs can be expected to develop new infrastructure projects organically, in tandem and chorus with broader trends of economic growth

and in conjunction with other broad-based improvements in human development and transformations of social relations (Murthy 2013).

To address questions of whether and how these ongoing projects and initiatives advance the cause of water justice, I focus my initial research inquiries on two primary areas to align my work broadly with evolving themes in the social science literature. First, I asked: Who benefits? And what effect do ongoing water infrastructure development initiatives have on social stratification among research participants? Initially the goal had been to examine the equity impacts of inter-basin water transfers on residents in both the Kathmandu and Melamchi Valleys. Instead, I found myself spending a lot more of my time in the Kathmandu Valley than I had initially envisioned where what I learned about the region's ancient water technologies complicated and refined my own understanding of the concept of development. Investigating specific components of these broader research questions helps expand upon existing scholarly and practice-oriented notions of international development, (political ecological) theories of water justice, and water governance debates around neoliberalism, the role of the state and community-management.

In the remainder of this introduction, I first provide a brief overview of some core concepts and insights from the academic literature that broadly align with the structure and form of the remaining chapters of this work, focusing on three focal points from two bodies of literature. First I make a brief effort to define the term 'development', which has evolved in meaning in recent years, and whose connotation

remains contested between authors who associate it more narrowly with a transition to industrial capitalism and authors who adopt a more expansive meaning that includes older and non-western technologies, along with conceptions of rights and freedoms. Focusing on a more expansive definition of this concept provides a theoretical basis for making sense of the Kathmandu Valley's own indigenous technologies, described in chapter 1. Next, I review a body of literature on water justice, drawing heavily on the field of political ecology, which will provide a conceptual basis to inform the participant-observation and ethnographic findings of daily water practices and water micro-politics included in chapter 2. Then I briefly outline some perspectives on water governance, focusing on different heuristic categories for understanding the governance of the commons ranging from market and state-centered approaches to community-management. This will provide a theoretical and conceptual basis for understanding elite-driven planning processes described in chapter 3 – a chapter that will also re-visit competing understandings of development. The literature review below is by no means exhaustive but provides a brief foray into a few core definitions and theoretical concepts that will inform the later sections of this work. This will be followed by an overview of research methodology, and an introduction to the technical parameters, social and demographic characteristics of the study area in Bagmati Province, Nepal.

### *Literature Overview*

*Defining Development: Beyond and (long) before “modernization” and its discontents*

The concept of ‘development’ informs a wide body of scholarly work and is also central to the workings of many international organizations and government policies. Throughout the course of conducting research in Nepal, I frequently encountered the Nepali language term, *bikas*, or development, and its adjective form, *bikasi*, or developed, over the course of interviews with research participants. Although a more thorough and detailed exegesis of scholarly work in development studies remains beyond the scope of this research, I will endeavor to outline briefly how this term has been used historically in the academic literature, both in the Anglo-American tradition and in Nepalese literature, in order to argue in favor of a more expansive conception of what *bikas*, or development, is and can be. The impetus for this brief discussion and effort to trace and define ‘development’ emerged from numerous conversations I have had in Kathmandu about the technology, engineering and architectural design of the Kathmandu Valley’s ancient water distribution systems, which are predicated upon native technologies that developed endogenously over the course of centuries. Given that a large body of scholarly literature, not only in the Anglo-American tradition. but even among some practitioners in present-day Nepal, imagines development to be a concept synonymous with modernization theory and technologies of the European Industrial Revolution, a brief review of how different authors understand development will provide an intellectual and theoretical

foundation for more detailed investigations of the Kathmandu Valley's indigenous water technologies in the following chapter.

The intellectual foundations of the concept of 'development' that's been the most prevalent historically in the Anglo-American tradition emerged from efforts in 19<sup>th</sup> century Europe to make sense of the social transformations that took place during what Tönnies described as the transition from *Gemeinschaft to Gesellschaft*, or community to society. Part and parcel with what Polanyi (1944) would later term as "The Great Transformation" was a shift away from norms of reciprocity and (re)distribution rooted in personal and community relationships toward a wage-labor system based on technologically-mediated, surplus production and characterized by an increasingly complex division of labor. While Marx, Durkheim and Weber – the three European philosophers most frequently included in sociology curricula worldwide – all developed their own theories and methodologies to make sense of the shift to industrial modernity in 19<sup>th</sup> century Europe, it was only in the mid 20<sup>th</sup> century that development and modernization theories and discourses began to assume a prominent and hegemonic role within many Anglo-American academic circles.

Many of the authors most commonly associated with theories of development in the English-speaking world described policy prescriptions for a shift from traditional, agrarian modes of production, defined by what they lack, toward a more prosperous form of urban, industrial modernity that could be achieved by any society simply by adopting the right policies and norms of materialistic economic growth (Parsons



1951; Parsons 1964; Rostow 1960). Even later attempts to address shortcomings of Rostow's modernization theory or Parson's structural functionalism, ultimately still relied on definitions and concepts of development that were synonymous with the Euro-American shift toward industrial modernity, as understood through the prism of the Industrial Revolution. For instance, Frank's (1966) research on the development of underdevelopment posited that "underdevelopment was and still is generated by the very same historical process which generated economic development: the development of capitalism". Though Frank's work was intended as a critique of how exploitative practices of governments and firms in the West systematically extract resources from what he viewed as the peripheral regions of the world, it nonetheless located the industrialized West as the locus of agency from which all development and underdevelopment sprang, ultimately re-affirming the very concept of development that drove the work of thinkers like Rostow. Wallerstein's (1974) world-systems theory was in many ways a marriage of Parson's efforts to view the social (world) system as a singular, organism-like unit for holistic analysis with Frank's emphasis on processes of extraction and exploitation that he viewed as inherent to industrial capitalism. In any case, all of these authors shared a common understanding of development that was inextricably tied to the emergence and diffusion of industrial capitalism, with Europe, and the West (and later "North"), elevated as the model of what developed societies look like, for better or for worse.

Such paradigms soon became incorporated into the intellectual thought and discourses of scholars and policymakers in many countries around the world.

Anthropologist Dor Bahadur Bista's (1991) *Fatalism and Development: Nepal's Struggle for Modernization* would become one of the most widely read social scientific works published by a Nepalese author. Dissatisfied that previous political-economic analyses of Nepal fail to look into socio-cultural and religious values, Bista's primary contention is that a configuration of cultural and ideological practices, or "fatalistic hierarchy" among Nepal's ruling *Bahun-Chhetri* minority has had a clear and negative impact on Nepal's economic development (Bista 1991). In Bista's words, "fatalism is connected to dependency, robbing people of personal control ... thereby diminishing their motivation for personal achievement (Bista 1991: 151). Though this book remains among the most heavily cited social scientific works published by a Nepalese author, Bista never does define or operationalize key terms like 'development' and 'modernization' before showing their causation with fatalism. Despite Bista's widespread popularity among scholars of Nepal, Acharya (2017) describes his work as a "hasty duplication of modernization theory of Talcott Parsons overridden by Weberian economic sociology". That Bista never felt compelled to explain what he understood his book title's words of 'development' and 'modernization' to mean - even though he devoted numerous pages to expounding upon what he meant by 'fatalism' - is testament to the *a priori* quality that development or *bikas* had assumed in the scholarly imagination by the late 20<sup>th</sup> century.

Escobar's (1995) *Encountering Development: The Making and Unmaking of the Third World* provides a post-structuralist critique of how discourses of

(under)development have come to dominate the way Africa, Latin America and much of Asia are represented, not only among Anglo-American academics, but by much of the world's elite. For Escobar (1995), the policies, institutions, practices and techniques that became the focus of planners and policymakers intent on advancing the goal of 'development, or re-making the world in the image of Western Europe and the United States, turned out to be more of a nightmare than a dream for the very subjects targeted by such interventions. Escobar ultimately comes to question not only the feasibility of development, but also its desirability, eventually posing suggestions for a post-development future (Escobar 1995; Escobar 2000).

Nonetheless, these very suggestions still rely on a definition of development that involves re-making the world in the image of the West *cum* North, ultimately re-affirming an understanding of what development means that has gone largely unchanged and unquestioned over many decades of scholarly work and government policymaking. Such understandings can also be seen embedded in the writings of Nepalese authors from this period. For instance, Shrestha (1998) decries a lack of development in Nepal, which he attributes to a lack of civil society, while Dahal (2002) also describes a similar lack of development, before making an appeal for more resources to support NGOs and civil society.

Nobel prize winning economist Amartya Sen's (1999) work on *Development as Freedom* is one of many more recent efforts to re-orient understandings of the concept of 'development' away from industrialization and economic growth, as measured by GDP, and toward an understanding of development as an expansion of

the freedoms people enjoy and have reason to value. Sen's (1999) conception of freedom is expansive, including such factors as freedom of opportunity, freedom to pursue an education or health care, and freedom from want and hunger. By directly stating that investing in the general welfare of the broader population is part and parcel with the process of development, Sen is also directly challenging earlier modernization theorists such as Rostow (1960) who asserted that only after achieving sufficient levels of economic growth and personal income could policymakers invest more broadly in social welfare measures. Beyond critiquing earlier modernization theorists, Sen (1999:15) also directly refutes the Lee hypothesis, named for former Singapore Premier Lee Kuan Yew, which asserts that denying political and civil rights is not only acceptable, but desirable, if it more quickly improves economic well-being, arguing instead that high incomes don't lead to well-being on their own and that civil rights should be approached as a direct good on their own terms rather than an end-result of GDP growth. Nonetheless Sen's heavy emphasis on political freedoms and the right to dissent as a core part of his definition of development, though lauded in many democracies, has come under increasing strain in recent years with the rise authoritarian developmental models, even as an increasing number of scholars have adopted more expansive understandings of development than was the case for much of the 20<sup>th</sup> century.

In more recent years, an increasing number of authors have re-oriented their understandings of what development can mean toward more expansive definitions that emphasize technologies and practices that already existed prior to the age of European industrial capitalism. Social scientific studies published by Nepalese authors after the immediate collapse of the authoritarian Panchayat regime in 1990 often characterized Nepal in terms of what its development lacked in comparison to the wealthier industrialized nations (Bista 1991; Dahal 2002; Shrestha 1998). Nonetheless during the first two decades of the 21<sup>st</sup> century an increasing number of authors from Nepal have published works on indigenous technologies and social practices that have supported urban civilization in the Kathmandu Valley for many centuries (Bhandari 2014; Dahal and Timisina 2006; Neupane 2015; Tiwari 2016). Although present-day Nepal is characterized by a low level of industrialization and integration into global commodity supply chains relative to regional standards, the Kathmandu Valley is home to an ancient and enduring urban civilization located along historical trade routes that had its own complex division of labor many centuries before the first European contact. The indigenous water technologies of the Kathmandu Valley developed endogenously over millennia, and because, unlike in India, these ancient water systems were never disrupted by engineering projects implemented by European colonizers, they continue to supply household water to hundreds of thousands every day, just as they have done for 1500 years (Neupane 2015; Tiwari 2016). Though many of the Nepalese scholars who are experts on such technologies do not contribute directly to Anglo-American conferences on

development studies, many of their findings necessitate a definition of development that transcends the geographical and conceptual confines of the transition to industrial capitalism in Europe and the West or North.

The other major factor that complicates earlier understandings of development that place Europe and the United States as the primary locus of agency driving development and underdevelopment is the rise of China, India and competing models for providing international lending, financing and overseas development assistance. Throughout the second half of the 20<sup>th</sup> century, India was far and away the single largest source of foreign direct investment (FDI) in Nepal and was also one of the largest donors of overseas development assistance (ODA) (Mulmi 2021; Pradhan 2012). Far from being viewed through a conceptual prism of ‘South-South’ relations, a term often used in the Anglo-American literature, India’s actions in Nepal have largely been characterized as exploitative, or even neo-imperial, by Nepalese authors and a wide swath of the general population (Mulmi 2021; Pradhan 2012; Upadhyaya 2012). More recently, China has replaced India as a primary investor and sponsor of infrastructure projects in many sectors, with Nepal among the most enthusiastic participants worldwide in China’s Belt and Road Initiative (BRI) (Mulmi 2021; Sapkota 2019). Far from Sen’s (1999) emphasis on political freedoms and the right to dissent as part and parcel with the concept of development, many of the largest mega-projects being financed today are inextricably linked to authoritarian modes of governance (Lekunze 2020; Mulmi 2021; Nandy 2020).

Tanzanian-born author Manu Lekunze (2020) writes that it is specifically the perceived failures of the free-market, neoliberal model of development promoted by western countries and institutions like the World Bank that have helped buttress the rise of a new class of political leaders who seek to reduce poverty through stronger economic and social control of the governed. In the Nepalese context, Nandy (2020) and Thapa (2016) also both express concern over the durability of democracy in Nepal, although Nandy remains somewhat more optimistic that existing civil society organizations can help buffer somewhat against an authoritarian turn. Mulmi (2021) also highlights Nepal's recent turn toward China both in terms of its bilateral relations with its neighbors and in terms of the underlying ideology of its political leaders, yet also emphasizes that there remain important social distinctions between the two countries and that development in Nepal will never simply mirror a distinctly Chinese path. Indeed some of the most compelling insights about development in Nepal that I encountered over the course of this research were those that emphasized the endurance of the Kathmandu Valley's own indigenous technologies over the centuries throughout many successive waves of political changes in leadership and transformations in neighborhood geopolitics (Bhandari 2014; Dahal and Timisina 2006; Tiwari 2016). For this reason, I argue in favor of a more expansive definition of development, one that presupposes the technologies of the Industrial Revolution in Europe, and that can endure throughout varied modes of governance. Nonetheless, for such development to be enjoyed and shared by all citizens, there doesn't necessarily need to be one particular form of government or another, but there does need to be

justice, especially when it comes to how the most basic resources like water are  
...channeled and distributed across a population.

### *Water Rights and Justice Perspectives*

A wide body of existing research highlights the diversity and complexity of different cases where water has been channeled or diverted from across jurisdictions and between basins (Crow 1995; Crow and Singh 2009; Mollinga 2014; Swyngedouw 2004; Swyngedouw 2009; Swyngedouw 2015 Zwartveen and Boelens 2014). In some cases, these diversions have triggered enhanced dialogue and negotiations between discrete political entities, with mixed degrees of success (Crow 1995; Crow and Singh 2009). In other cases, water diversions have re-affirmed the prominence of historically dominant groups, while elsewhere, they open up new avenues for political engagement and contestation of the status quo (Boelens 2013; Mollinga 2014; Swyngedouw 2009). At the heart of many of these studies lie concerns about justice and equity and questions about the dynamics of collective decision-making processes in the midst of large-scale water infrastructure projects. The purpose of this section will be to draw upon and synthesize academic perspectives on water justice and collective action, in order to identify common areas of concern that will inform justice-motivated action research on the MWSP. In the forthcoming paragraphs, I will first review conceptual understandings of water rights and water justice to understand the multiple and plural meanings these concepts can convey. Next, I review recent



developments in theories of collective action for governing the commons, drawing attention to efforts to articulate a more expansive understanding of governance that unfolds beyond the parameters of formal institutions. This will enable me to propose how each of these distinct intellectual traditions converges around a renewed interest in daily routines and practices as a way to extend the scope and reach of these theories beyond a narrowly defined public sphere of state actors and agencies. By exploring these synergies and applying them to the empirical study of the MWSP, I will aim to bridge recent insights on water justice with longstanding approaches to collective action for the commons.

Conceptions of rights and justice occupy a prominent place in many of the qualitative and critical social theories of water and society. Given that a human right to water has recently been affirmed by the UN General Assembly, international legal institutions and many national governments (Murthy 2013), defining and conceptualizing what these terms actually mean may be of crucial importance not only to social theorists, but also for political actors and for all those for whom these rights have yet to be realized in practice. Though multiple scholars laud the symbolic significance of such measures (Murthy 2013; Sultana and Loftus 2013), other authors address some of the shortcomings of what is omitted from international accords affirming a human right to water (Bakker 2013; Goff and Crow 2014; Joy et. Al 2014). Some authors focus their critiques on the narrow application of this right to drinking water and sanitation, omitting other ways that water is crucial to lives and livelihoods (Goff and Crow 2014; Joy et. al 2014). Other authors question the practical utility of framing water as

a human right, questioning whether such an approach unwittingly re-enforces Eurocentric categories of individual rights while promoting over-reliance on formal legal institutions for dispute resolution (Bakker 2007; Bakker 2013). Irrespective of their differences, all of these theorists share common concerns about dynamics of exclusion from water infrastructure and remain especially skeptical about private-market and elite-driven processes of planning and decision-making. In order to move in the direction of justice, such processes must become more broadly inclusive and more receptive to the needs of the urban poor.

Out of shared concerns around justice and equity, emerge multiple conceptualizations about what water justice means and how greater justice might best be achieved. Definitions and conceptions of water justice remain as varied and complex as the settings and contexts where authors conduct their research, yet concerns around equity and the plight of the poor and marginalized remain central to much of the scholarship of the field (Bakker 2007; Bakker 2013; Boelens 2013; Boelens et. al 2016; Crow and Odaba 2010; Joy et. Al 2014; Lu, Ocampo-Raeder and Crow 2014; Murthy 2013; Perreault 2014; Sultana and Loftus 2013; Swyngedouw 2004; Swyngedouw 2009; Swyngedouw 2012; Swyngedouw 2015; Zwartveen and Boelens 2014). Though different authors focus on different dimensions of what water justice actually means in practice, common concerns include a desire to make water governance and management more broadly inclusive and skepticism toward private,

water-for-profit schemes that make safe domestic water cost-prohibitive for millions of the world's poorest citizens (Bakker 2007; Bakker 2013; Boelens et. Al 2016; Jaglin 2002; Perreault 2014; Zwartveen and Boelens 2014). Nonetheless, questions of access and distribution only encompass one particular dimension of water justice, and in order for new water supply projects to be broadly supportive of advancing the goal of equity, strategies for implementation will need to be plural and multiple meanings of justice will need to be given voice.

Building upon Schlosberg's (2004; 2013) theorization of environmental justice (EJ), Zwartveen and Boelens (2014) make one of the clearest and most specific efforts to define dimensions of water justice that can be applied across a range of cases and contexts. They consequently identify the following four dimensions of water justice: distributional justice, procedural justice – viz. justice in decision-making processes, cultural recognition and respect, and socio-ecological justice (Zwartveen and Boelens 2014). These four conceptual categories can best be understood as inter-related and overlapping, and must all be accounted for if water-related injustices are to be countered through policy planning and activism. As with many other critically-oriented theorists, Zwartveen and Boelens (2014) envision that these dimensions of justice can provide a conceptual basis for political action and for contesting prevailing orthodoxies that preserve the power of historically-dominant groups in decisions about governing water (see also: Bakker 2007; Bakker 2013; Boelens et. al 2016; Perreault 2014). Such authors are particularly interested in the transformative potential not only of material water access, but also of the ways in which

having greater voice in decision-making processes and respect for group rights can help support alternative models of development – ones that are more socially inclusive and less destructive of the ecological worlds in which human societies embedded. To that end, many such authors challenge prevailing orthodoxies that privilege quantitative modeling as the only legitimate tool for expanding access to water, emphasizing instead the benefits of including non-experts and expanding the capacity for meaningful decision-making beyond a narrow swath of elite stakeholders (Bakker 2007; Boelens et. al 2016; Perreault 2014).

Supporting the perspectives and voices of non-experts and non-scientists thus appears to be an essential prerequisite for ensuring that the benefits of new development projects, like the Melamchi Project, are shared most broadly. Benner and Pastor (2015) emphasize that there can exist strong compatibilities between social equity and sustained economic growth, and that embracing collaboration between communities and social groups not only contributes to a stronger sense of local identity, but also helps forge more economically resilient communities. The expansion of drinking water infrastructure in Nepal through initiatives like the MWSP carries with it great potential to lay the material foundations that will ultimately support sustained and inclusive economic growth and human development. Ensuring that this project realizes its full potential to achieve these goals, however, will likely require deeper understandings of, and input from, multiple communities in both Kathmandu and Melamchi whose future prosperity and well-being is inextricably linked to the success of the project. Understanding more deeply who benefits from the MWSP, and how

this project affects multiple modes of social stratification cannot be achieved only by analyzing policy documents and official statistics – rather this will require intensive engagement with the daily practices and lived experiences that are productive of material inequalities and that drive and transform processes of stratification.

One area where recent scholarship on water justice directs focus and attention is toward micro-level practices, interactions and routines as productive forces in (re)producing inequality and stratification (Bakker 2007; Bakker 2013; Nightingale 2011; Truelove 2011). Of central concern to many theorists of water justice are instances where the re-scaling of water governance tilts control away from local communities and into the hand of powerful and elite actors (Bakker 2007; Bakker 2013; Perreault 2014; Swyngedouw 2015; Truelove 2011; Zwartveen and Boelens 2014). Instances of water injustice that hinder people from living the lives they value are not lofty intellectual notions, but rather are experienced iteratively through daily practices and routines involving water and sanitation. Recent ethnographic and interview-based research on water injustices emphasizes how multiple axes of inequality are produced and sustained through the embodied consequences of daily water practices (Houweling et. al 2012; Nightingale 2011; Truelove 2011). Thus, moving toward greater water justice will require a move beyond a focus on the flow of water itself, toward policy interventions that direct greater attention toward how differentiated roles within a community and a household shape the ways that practices around water influence livelihoods and well-being.

Extending ideas from this body of literature to address these imperatives requires intensive engagement with small water-users across a range of scales and geographic locations over an extended period of time. Prakash and Molden (2019) performed one of the first such comprehensive qualitative studies of household water users in the Kathmandu Valley, finding that lower-income women, in particular, face disproportionate burdens in water collection and re-affirming earlier studies from other locations that emphasize how economic status interacts with informality and gender to produce water inequalities (Crow and Odaba 2010; Nightingale 2011; Truelove 2011). My own research modifies and extends existing theories on water justice by examining how various social variables are inextricably tied to different physical modalities of water access across geographic locales, with differential implications for the equity impacts of inter-basin water transfers. My research demonstrates that the expansion of piped municipal supply will almost certainly alleviate the daily struggles that many households experience and, in some cases, may well bring added economic benefits to residents of core urban neighborhoods, but that efforts to link inter-basin transfers with groundwater recharge, pond restoration and maintenance of historical water systems are needed for the effects of such transfers to have more wide-ranging equity impacts. This expands existing theories on water justice by investigating how linkages between municipal water supply, native water systems and informal water economies shape daily water practices across a water-stressed basin to emphasize the need for a more wide-ranging, multi-faceted approach

to water provision that protects and preserves the wide range of modalities that citizens rely on for access.

*Modes of water governance and collective action approaches*

Another area of literature that provides a theoretical foundation for this research builds upon theories of water governance that construct and define heuristic categories for making sense of supplying water and governing the commons. In her work on alter-globalization and the commons, Karen Bakker (2007) constructs three conceptual categories of approaches to governing water: first are free-market, neoliberal approaches that treat water as a commodity, second are state-centered approaches that often entail centralized decision-making by bureaucratic authorities, and third are community-based, collective action approaches for self-governing the commons. Bakker (2007) is intervening in what were then ongoing debates about whether to define water as a human right – something realized three years later by the United Nations – and saw the need to move beyond the public/private distinction often espoused by anti-privatization activists. Indeed an emphasis on community governance and collective action has been present in the political science literature for much longer, while community-managed water systems have been prevalent in Nepal dating back many centuries (Bhandari 2014; Dahal and Timisina 2006; Ostrom 2014). A brief overview of how such perspectives intersect with water justice and rights concerns can be found in the paragraphs that follow.

For many decades, collective action approaches have advanced the notion that self-governing cooperative arrangements are highly effective in managing common pool resources like water, offering an alternative to dominant state- and market-centered approaches (Blomquist 1988; Ostrom 1965; Ostrom 1990; Ostrom 1999). These theories emphasize value pluralism and social heterogeneity, drawing attention to how locally specific social and geo-physical attributes give rise to a diverse array of governance arrangements (eds. Cole and McGinnis 2017; Ostrom 1990; Ostrom 1999; Poteete and Ostrom 2004). In recent years, many scholars publishing within this intellectual tradition have incorporated challenges from critical theorists to extend the scope of collective action analyses beyond the parameters of formal multi-stakeholder forums and into the sphere of everyday practices (Doss and Meinzen-Dick 2015; Morales and Harris 2014; Sharma and Nightingale 2014). In doing so, they bring longstanding understandings of collective action in water governance more closely in-line with recent trends among critical theorists of water justice. This helps create new opportunities for cross-fertilization and cross-conversations between two fields that emerged out of discrete intellectual lineages.

Many authors publishing in the collective action tradition have drawn heavily upon empirical findings from collective forums for self-governing the commons in Nepal, providing a grounded basis for testing and extending previous findings and conclusions to the MWSP (Doss and Meinzen-Dick 2015; Nightingale 2002; Nightingale 2011; Ostrom 2014; Sharma and Nightingale 2014; Varguhese 1999; Varguhese and Ostrom 2001). One focal point of many of these previous studies has



been community-user forestry groups (Doss and Meinzen-Dick 2015; Nightingale 2002; Sharma and Nightingale 2014; Varughese 1999; Varughese and Ostrom 2001). Such collectives have often developed endogenously between small groups of forest users and have persisted without interruption throughout periods of large-scale political change and instability. Similar processes of governance have also existed for generations in Nepal through the collective management of agricultural irrigation systems, which exist in nearly every district of the country (Ostrom 2014). Such venues for governing the commons often exhibit multiple and contradictory effects on existing patterns of social relations and inequalities: these forums can offer participants opportunities to challenge and contest dominant social hierarchies, yet in doing so, they can also re-enforce boundaries of social difference (Doss and Meinzen-Dick 2015; Nightingale 2002; Nightingale 2011). Participant-observation and ethnographic work on collective action venues in Nepal reveals that the lived experiences of inequality in governance arenas is integrally linked to and embedded in broader patterns of social relations (Doss and Meinzen-Dick 2015; Nightingale 2011). This prompts the need to extend analyses beyond formal venues and into complementary spheres where stratification is produced and sustained iteratively through material-discursive practices.

Recent scholarship that strives to extend collective action analyses more broadly into the community and household is often quite limited in its conceptual engagement with scale. Most of these authors draw upon cases where collective governance occurs in small, often village-based, venues with little indication of whether or how

such analyses might be applicable to collective action dilemmas that surround large-scale projects in an urban context (Doss and Meinzen-Dick 2015; Nightingale 2002; Nightingale 2011; Ostrom 2014; Sharma and Nightingale 2014). At the same time, recent theorists of water justice emphasize just how crucial scale is in shaping how water justice dilemmas are perceived, framed and contested (Bakker 2013; Boelens et. al 2016; Perreault 2014). Addressing and extending gaps in these recent theories thus requires intensive engagement with water users and development practitioners that goes beyond observing formal policy forums, instead focusing more broadly on how geopolitics and grassroots resistance interact with longer historical trends at the urban and regional levels, in turn shaping and constraining pathways for implementing large mega-projects and preserving ancient, community-managed infrastructure.

My research addresses gaps in these theories by examining how pressures from above and below confound the broad-based expansion of municipal water infrastructure, resulting in multiple modalities and layers of water systems at differential and overlapping scales with significant implications for justice and equity impacts. What distinguishes this research from other recent works on large-scale water infrastructure projects is an effort to situate contemporary dynamics of global geopolitics and grassroots resistance within a much longer relational and historical context, drawing upon the work of local scholars and historians to interrogate critically how processes of nation- and state-making over the centuries inform the way that elite actors and planners respond to external and internal pressures, complicating explanations of

development that rely solely on contemporary definitions of processes like neoliberalism and modernization. This research also builds on existing approaches to water governance by emphasizing how inter-basin water transfers carry the potential to provide co-benefits for multiple other layers of household water provision, ranging from private and community wells to community-managed systems to ancient stone taps, but only if conjunctive management strategies are adopted that are appropriate to the much longer historical context of urban water provision and respectful of well-established informal and indigenous water networks. Multiple modes of water governance co-exist in contemporary Kathmandu, with most households relying on multiple sources over the course of the year. The continued existence of such diverse sources of water is not only central to the cultural identity of many residents, but also crucial to providing additional layers of water security given the specter of an increasingly unpredictable climate.

In the section below, I outline the methodological blueprint I followed while conducting intensive research on water practices in the Kathmandu Valley and the MWSP, in an effort to test and extend the scope of these recent theories on development and indigenous technologies, water justice and governance. In doing so, I briefly describe how my focus on water transfers also extends to the Kathmandu Valley's own ancient water technologies, and on daily water practices in peri-urban spaces that lie beyond the scope of the piped municipal water network. Below is a brief overview of the research methodology, the technical parameters and characteristics of the MWSP, a brief synopsis of the social and demographic

characteristics of the study area, followed by an outline for the remainder of this work.

### *Methodology and Overview of Dissertation*

This research is based on fieldwork conducted in Nepal, primarily between 2017 and 2019. A limited number of follow-up interviews and observations from 2020 can be found in the final concluding section of this work. This fieldwork relied primarily on participant-observation, semi-structured interviews and snowball sampling techniques to reach new participants. Visits to various fieldsites enabled me to see firsthand the challenges of large-scale infrastructure construction as well as alternative modalities for accessing household water. These techniques were complemented by extensive document analysis of technical reports, environmental impact assessments, census data, financial documents produced by international lending organizations and communications and press reports released by journalists and government officials from Nepal, the United States, India and China. In sum, I conducted a total of 205 semi-structured and unstructured interviews (n=205) over a period of nearly three years with 105 unique research participants. A small number of core participants were involved in relatively frequent interviews about daily water practices, especially neighbors and small business owners in the two different wards where I was living during different portions of the research period. A more detailed overview of subject-specific methodology can also be found at the beginning of each subsequent chapter.

Snowball sampling through contacts that I made early in the fieldwork led me to investigate in depth the Kathmandu Valley's own indigenous water technologies and how they were inextricably linked to social relations and political changes over time. This portion of the research draws on 24 interviews with nine professors at local institutions of higher education in the Kathmandu Valley, in addition to 11 local graduate students with expertise in subjects ranging from architecture and engineering, to history to in-depth study of classical Sanskrit literature. These interviews were instrumental not only in understanding how these ancient technologies were engineered, but also how particular forms of social relations were embedded in the design principles as well as how different perspectives on local history shape understanding of Nepal's external relations in the contemporary moment. I complemented these interviews with numerous visits to fieldsites where ancient water technologies are still in use today, including participant-observation in all three administrative districts that comprise the Kathmandu Valley.

The overwhelming share of interviews I conducted (n=167) were on daily water practices where I strived to include participants across a wide range of economic backgrounds and geographic locations. I complemented these interviews with participant-observation of various modes of water collection and water storage techniques, including learning how to operate pumping machinery, conducting participant-observation at various ancient stone taps, and riding along with a water tanker truck driver and his assistant to better understand the dynamics of informal water economies. Along the way I learned how well-water conditions can be a make-

or-break factor in generating economic opportunities, how household water storage infrastructure can play a crucial role in alleviating daily water struggles, and why snakes are revered for their role in maintaining the canals and conduits that feed ancient stone taps. Despite these wide-ranging forms of participant-observation, I conducted a larger number of interviews with a small group of core research participants, including neighbors I would see almost every day throughout the research period. Although many of the respondents with whom I conducted the largest number of interviews lived in the urban core, I also made sure to extend the planned participant-observation and semi-structured interviews on daily water practices to peri-urban areas beyond the scope of the current piped municipal network. This enabled me to investigate in greater depth the variety of physical and infrastructural modalities residents currently rely on to meet their daily water needs, while also analyzing groundwater challenges more closely.

Third and finally, I conducted interviews with journalists, members of the international donor community and foreign contractors, adopting a polymorphous approach toward understanding elite-driven infrastructure planning processes, after my own efforts to make contacts with higher-level policymakers were met with more limited success. Though these interviews were more limited in number (n=14), I was able glean valuable information and documents about the dynamics of international development initiatives in Nepal, the relationships between contractors, the Nepalese government and international lending agencies, and the challenges of conducting social scientific research involving elite research subjects. I was able to complement

these interviews with a trove of technical reports and documents, observations from local journalists who routinely cover political leaders and press releases and public speeches by political actors themselves. Given that the prospect bringing inter-basin water transfers to Kathmandu has been a hot political topic in Nepalese political discourse for more than three decades, there proved to be no shortage of statements and information issued by planners and political leaders for secondary data analysis.

Although this fieldwork relied primarily on participant-observation, semi-structured interviews and snowball sampling techniques to reach new participants, there were also some populations where gaining entree posed a challenge, ultimately leading to some amendments in my research plan. While delays of planned inter-basin water transfers were a primary driving force behind my decision to focus the interviews I conducted more exclusively on Kathmandu Valley residents, I also made some modifications to the particular locales where I conducted participant-observation and semi-structured interviews on daily water practices of marginalized urban populations based on which particular communities were the most receptive to participating in the research. Some of the communities that I hypothesized would be most directly impacted by the import of Melamchi water in the Kathmandu Valley were squatter settlements that lined the riparian floodplain of the Bagmati River – a river that may be inundated with far greater volumes of water once inter-basin transfers begin. Though some of these squatter settlements have existed there for decades, I would come to learn from local contacts that these particular communities are renowned for being particularly resistant to any form of outside intervention from municipal

authorities, health care workers, or researchers whether foreign or local. Early on in the fieldwork, however, I did become acquainted with a resident of another, non-riparian squatter community who had migrated to Kathmandu from India and was enthusiastic about showing me around his home and introducing me to his neighbors. Through snowball sampling techniques I was then able to learn about daily water practices and livelihoods in this particular settlement in much greater detail. This allowed me to complement the numerous interviews I conducted with the 90% or so of urban Kathmandu residents whose housing is recognized by some level of authorities with a community that lacked such recognition. Not included in this description of methodology are two preliminary sets of baseline interviews I conducted with residents of the adjacent Melamchi Valley. A brief discussion of findings from these interviews can be found in the concluding chapter along with suggestions for subsequent research.

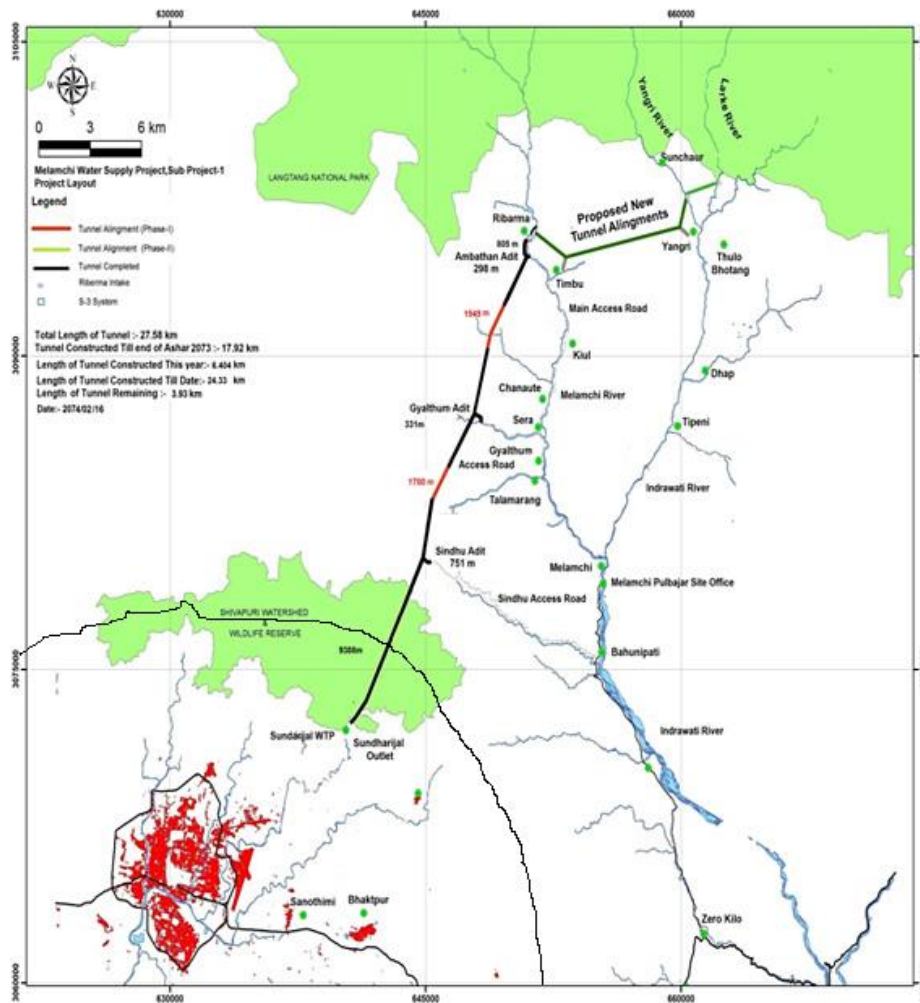
In the paragraphs below, I will first provide a brief technical overview of the planned inter-basin water transfers from the Melamchi River to the Kathmandu Valley to provide more context for the case study. This will be followed by an overview of the social and demographic characteristics of the study area to provide further background on key ethnic communities and administrative entities that are central to the core arguments of this research. Finally, this section will conclude with an overview of the rest of the work, including core arguments from each of the following three chapters.



### *Overview of Melamchi Diversion*

The Melamchi Water Supply Project (MWSP) is a large-scale public works initiative to divert water from the Melamchi River in Sindhupalchowk District to supply the vital domestic and drinking water needs of the burgeoning Kathmandu Valley (ADB 2017; GoN 2017). During the project's initial phase MWSP will divert roughly 170 million liters/day (MLD) of high-quality glacial meltwater that originates from the 7227-meter Langtang glacier to pumping and water treatment facilities along the northern tier of the Kathmandu Valley. Longer-term plans to supplement these flows with water from the nearby Yangri River are currently being studied. In support of the diversion, an intake facility has already been built in Melamchi Khola near the village of Gwaxhan where water will flow through two distilling basins to filter out suspended sediments larger than 0.2mm in diameter (Nepal Ministry of Water 2017). From there, the filtered water will flow through a 26.5 km water transfer tunnel, connecting the Melamchi Valley with the village of Sundarijal in the Kathmandu Valley – a location where pumping facilities already exist at a site where the much lower-volume Bagmati River drops sharply from the surrounding foothills to enter the Kathmandu Valley (Nepal Ministry of Water, 2017). Figure 0.1 below depicts a representation of the first stage of the MWSP, which was only completed after the conclusion of this fieldwork. This figure will be followed by a subsequent discussion of why such an overwhelming majority of Kathmandu Valley inhabitants deem this project to be necessary.

The red areas in the bottom left corner of Figure 0.1 below depict core urban areas in the Kathmandu Valley that are slated to receive imported water during the first phase of the MWSP. This includes the urban core of the ancient city of Bhaktapur, which appears as a non-contiguous red spot well to the east (right) of the main contiguous urban cores of Kathmandu and Lalitpur. Nonetheless, the most rapidly growing sections of the Kathmandu Valley lie immediately adjacent to these red areas where agricultural land has been converted into peri-urban housing in recent years. The thin, black curved line in the bottom left corner traces the Kathmandu Valley rim, roughly 1500 meters in elevation above the valley floor, The Melamchi River is the upper left branch of the river system shown on the right half of the map, while a green line depicts a proposed 6-kilometer tunnel to connect the Indrawati River further to the east to the Melamchi River tunnels in a yet un-initiated phase II of the inter-basin project.



(Figure 0.1 Phase I and (proposed) Phase II of the MWSP)

In part due to the region’s rapid population growth and intense urbanization, the Kathmandu Valley, like many other urban areas of the world, faces acute local water scarcity and degradation. Government of Nepal (GoN) statistics indicate that the Kathmandu Valley grew from a population of roughly 50,000 in the late 1960s to an estimated population approaching five million today (GoN 2017). Well construction typically occurs outside the purview of state oversight and comprehensive records of existing wells, pipes, and other water distribution infrastructure are not maintained

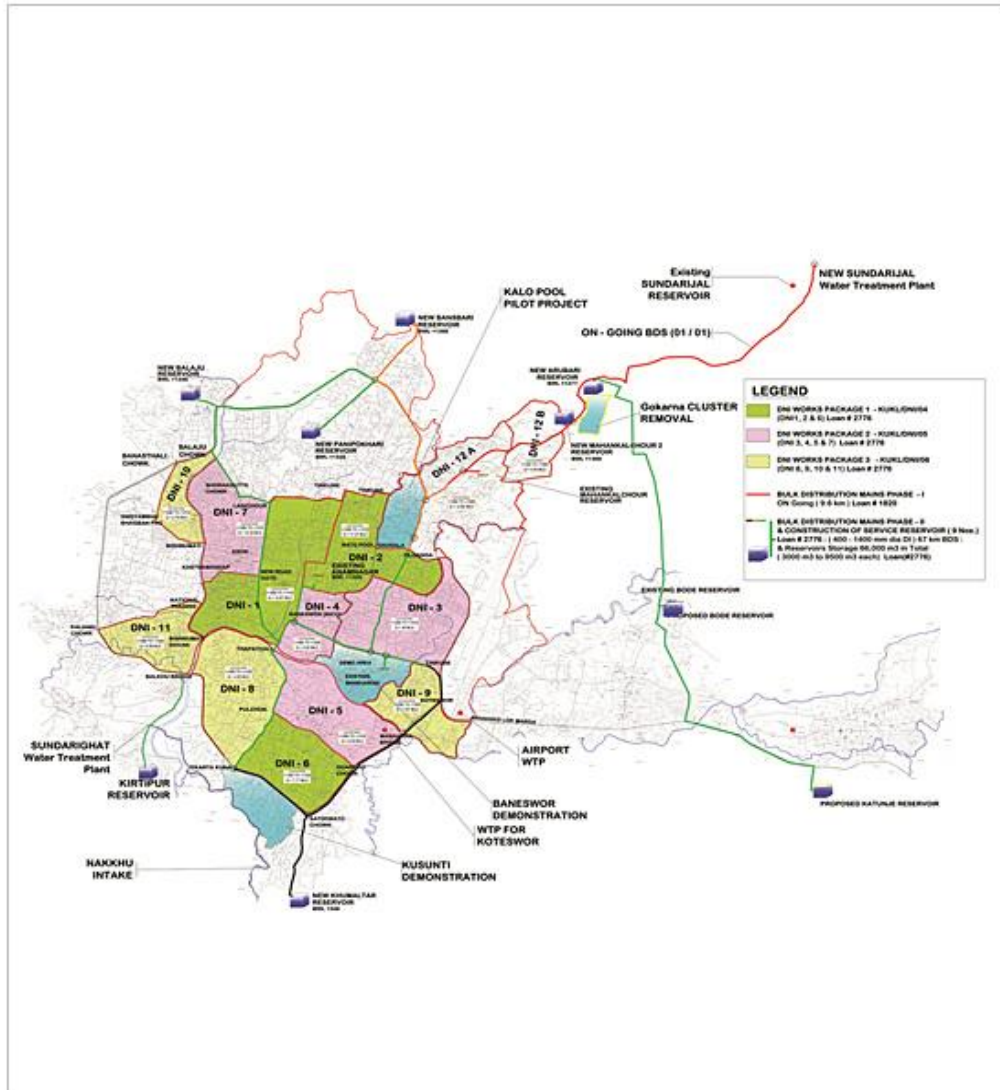
(Nepal Water Conservation Foundation 2017). In recent years, groundwater levels across the valley have fallen sharply in most places, many traditional wells and sprouts have dried up, and levels of contamination have increased in both surface and groundwater supplies (Nepal Water Conservation Foundation 2017). These effects have culminated in the drying of the Bagmati River – the primary watercourse draining the Kathmandu Valley. The Bagmati River is a traditional lifeline to Kathmandu Valley inhabitants that not only once provided services such as domestic water and waste disposal, but also continues to serve a sacred and ceremonial role for religious rites performed by the Valley’s predominantly Hindu population. Given these recent and intense socio-ecological transformations of the Kathmandu Valley’s historical waterscapes, support for the provision of supplemental water appears to be nearly universal among informed Kathmandu Valley inhabitants, yet many questions and doubts remain about what the actual implementation will look like.

The extension of piped municipal water across urban Kathmandu is expected to take much longer than the mere completion of MWSP. This is also being compounded by peri-urban growth in areas beyond the scope of the municipal network. When I first began this fieldwork in 2017, former Nepal Water Resources Minister, Dipak Gyawali, estimated that it would take roughly five to seven years to build enough new pipes and upgrade existing ones to distribute the full volume of water that’s slated to be delivered for domestic use (Nepal Water Conservation Foundation, 2017). Since then, the arrival of imported Melamchi water took roughly four years longer than official projections, although the upgrading and building of pipes in the Kathmandu

Valley unfolded with fewer delays than the completion of the Melamchi tunnels. Moreover, substantial amounts of privately and informally built pipeline connect to the expanding municipal network, resulting in large volumes of water being diverted to consumers whose connections do not appear on any official map or document (Nepal Water Conservation Foundation 2017). Because no records exist of where such pipes can be found or how extensive their reach is, extending the public water network will be fraught with planning challenges, even before factoring in the challenges of supplying water to many of the Valley's poorest residents whose dwellings will likely fall outside the scope of the planned network altogether. In the short and medium-term, however, the goal is simply to extend piped municipal water from the MWSP to a greater number of households to reduce pressures on local water supplies, improve public health and enable a larger portion of the population to share in the benefits that come with indoor piped water. Figure 0.2 on the page below depicts current plans to extend municipal water supply using the 170 MLD that will flow from Melamchi Valley to Kathmandu. These current plans will supply water to neighborhoods near the city center; neighborhoods along the urban periphery remain outside the scope of this current phase of planning.

Currently the availability of piped municipal water in the Kathmandu Valley ranges from roughly 75 MLD in the dry season to 125 MLD in the monsoon (KUKL 2019) against an estimated demand of more than 360 MLD (Global Water Forum 2017). The remainder of this demand is met through a wide array of modalities ranging from tanker truck and jar water deliveries, private borewells, communal wells, community-

managed water systems, ancient stone taps known as *hiti* or *dhunge dhara*, rainwater harvesting, spring water and small-scale informal water vendors. The green, pink and yellow areas on the figure below are all slated to receive imported water deliveries during the initial phase of the project. Other adjacent urban areas are slated to receive



imported water in later phases.

(Figure 0.2, courtesy of Melamchi Water Supply Development Board)

The progressive realization framework enshrined in the UN's Human Right to Water and Sanitation and ratified by the Government of Nepal does acknowledge the financial need for such services to be introduced gradually and piecemeal in many contexts (Murthy 2013), the arrival of imported MWSP water is expected to yield many more immediate benefits for the ecological and cultural well-being of the Kathmandu Valley's traditional water courses. A significant volume of the imported water will eventually be drained into the nearly dry Bagmati River once newly built water treatment plants come online, restoring threatened religious and spiritual uses of the Bagmati's waters and lowering the risks of water-borne illnesses for thousands who live and work adjacent to its banks (ADB 2017; GoN 2017; MWSDB 2017). Some of the most vocal proponents of the MWSP can be found among the ranks of Kathmandu's religious leaders. Such leaders have voiced support for restoration and clean-up efforts of local waterways in order to maintain longstanding cultural practices, religious processions, and cremations, all of which require sufficient flows in local waterways. Civil society groups, government officials and local business leaders have all followed suit in offering support for river restoration initiatives, though many groups have expressed numerous concerns ranging from the efficacy of existing efforts, to whether the current plans can account for rapid demographic change and population growth, to concerns that the benefits of the MWSP will accrue in the hands of a small and unrepresentative sliver of the Valley's population.

### *Social and demographic characteristics of study area*

The Kathmandu Valley is the most populous urban area in the Hindu Kush Himalayan (HKH) region and has experienced rapid rates of population growth in the 50 years leading up to the study period (ICIMOD 2019). Moreover, the Kathmandu Valley is the only major populated valley in the Middle Hills of Nepal without access to a glacial fed river, compounding the challenges of rapid urbanization. The steep walls of the bowl-shaped valley limit the extent of urban sprawl, with population density in the administrative area of Kathmandu Metropolitan City estimated at nearly 30,000/km<sup>2</sup> (77,600/mile<sup>2</sup>) (World Bank 2020). For comparison, New York City – the most densely populated major US city – has an estimated population density of 10,900 /km<sup>2</sup> (US Census Bureau 2020). Population growth rates in the valley have slowed from a high of more than 6% per/annum in the 1980s to an estimated 3.5% per/annum during the study period of 2017-2019 with current population estimates for the valley at close to 3 million (World Bank 2020).

Administratively, the valley is comprised of three districts – Kathmandu, Lalitpur and Bhaktapur – with homonymous metropolitan cities at each district’s core and steep, forested terrain along the periphery of each district’s administrative area. In between the metropolitan cities and the steep slopes lie rapidly growing peri-urban areas, which are currently experiencing the fastest population growth rates of any place in Nepal (World Bank 2020). Figure 0.3 below shows the boundaries of the three districts of the Kathmandu Valley.





(Figure 0.3 *The Kathmandu Valley is comprised of Kathmandu, Lalitpur and Bhaktapur Districts. Roughly 70% of the valley's population lives in Kathmandu District, while the districts' peripheries are covered with steep, forested terrain*)

The overwhelming majority of the Kathmandu Valley's residents belong to various ethnic and status groups native to the Middle Hills of Nepal, although a tremendous amount of ethno-linguistic and cultural diversity exists with over 100 different languages spoken, mostly belonging to the Indo-Aryan and Sino-Tibetan language families. The Nepali language, historically known as *Khas Kura* or *Gorkhali*, is a Sanskrit-derived language closely related to Hindi that serves as the primary lingua franca in the Middle Hills of Nepal and the language of government and education in the Kathmandu Valley. The Nepali language is also increasingly spoken as a first language among young urban dwellers in the Kathmandu Valley with ancestral roots in other regions of Nepal, in part due to a government policy during a period of authoritarian rule from 1962-1990 known as the *Panchayat* system that sought to promote a single national language and sense of cultural identity. Nepal's most recent

(2011) census indicates that the Nepali language is the mother tongue of 61.2% of residents of Kathmandu Metropolitan City compared with only 44.6% of citizens of Nepal as a whole (Nepal Census 2011).

Despite the widespread prevalence of the Nepali language in the present-day Kathmandu Valley, there has been a resurgence of efforts in recent years to preserve and promote the language and culture of the valley's indigenous Newari community. The term 'Newar' refers to the descendants of those who were already settled in the Kathmandu Valley prior to national unification in 1769, while the Newari language – also known as Nepal Bhasa – belongs to the Tibeto-Burmese branch of the Sino-Tibetan family of languages and is lexigraphically unrelated to the modern Nepali language (Khanal 2019). The Government of Nepal classifies the Newari people as one of 59 formally recognized *adivasi janajati*, or indigenous nationalities of Nepal, which refers to distinct communities with

## THE PANCHAYAT SYSTEM IN NEPAL

The term 'Panchayat', which literally means 'council of five' carries a very different connotation in the context of Nepal compared with the Indian village councils of the same name. From 1962-1990, Panchayat in Nepal were local-level units responsible for implementing top-down dictates from the central government at the village and ward levels. They were also responsible for identifying and punishing any dissent. Although nominally elected, Panchayat representatives were chosen from a slate of candidates pre-approved by the central government with all political parties and organizations strictly banned. The Panchayat system collapsed in 1990 with the transition to democracy and today the term 'Panchayat' in the Nepalese context often serves as a metonym for top-down authoritarian rule with no tolerance for dissenting views. This is in contrast to India where elected village councils, also known as Panchayat continue to perform local governance functions in rural areas.

their own mother tongue, traditional cultures, written and unwritten histories and geographic homeland who were already settled in Nepal prior to national unification in 1769 (NFDIN Act of 2002). The most recent census indicates that native Newari speakers comprise only 17% of Kathmandu's population, yet still constitute 77.2% of the population of Bhaktapur Metropolitan City, with Bhaktapur District the only one of Nepal's 77 administrative districts where a single ethnic group constitutes a majority (Nepal Census 2011). In early 2021, officials in Kathmandu Metropolitan City announced plans to make the Newari language a compulsory curriculum subject in all schools starting in 2022 to promote broader understanding of the valley's own indigenous history, language and culture (MyRepublica 3/15/2021; Nepalese Voice 2021)

Civil society groups representing the valley's native Newari population have also been active in advocating for more resources to be devoted to the maintenance and preservation of the Kathmandu Valley's indigenous water distribution systems, yet many within the community remain skeptical of the terms and conditions imposed by international lending organizations and the foreign donor community. In Kathmandu, as elsewhere, advocates for environmental justice and the rights of indigenous populations have emphasized the need for participatory and procedural justice to ensure that communities slated to be impacted by major infrastructure initiatives have opportunities to express their voices in planning processes and be heard and respected. This contrasts to narrower notions of distributional justice wherein marginalized communities have access to sufficient quantities of resources but have

little say over broader matters such as cultural integrity and inclusion (Zwartveen and Boelens 2014).

Public taps, known as *dhunge dhara* in the Nepali language, or *hiti* in the native Newari language of the Kathmandu Valley, have served as a community source of water dating back more than 1500 years. These ancient water technologies are fed by a network of conduits and canals, and linked to a series of reservoir ponds, many of which date back more than 2000 years, predating even the oldest public taps. Historically these ancient water distribution systems were maintained by *guthi*, or religious-oriented, social trusts, which have endured for millennia as a social institution that has provided for the general welfare of the Kathmandu Valley's native Newari inhabitants. In recent decades, the reliability of these ancient public water systems has declined, owing to rapid population growth and damage to some of the ancient canals caused by earlier efforts to bring piped water to local elites. Recent restoration work on some of these ancient reservoir ponds and canals has already had a demonstrated positive impact on raising nearby groundwater levels and improving the flow of water to ancient public taps. Bringing imported MWSP water to the Kathmandu Valley is expected to alleviate further the strain on the basin's groundwater resources given that the shallow aquifer is closely inter-connected with surface water sources. For this reason, the arrival of MWSP is expected not only to provide additional household water; it also carries the potential to rejuvenate the Kathmandu Valley's ancient water technologies, but only if deliberate conjunctive management strategies are adopted.

### *Overview of Dissertation*

The first chapter of this research provides an in-depth critical social history of the Kathmandu Valley and its indigenous water technologies, describing how technologies and water systems evolved over the centuries in tandem with successive waves of political transformations and changes in social relations among the valley's inhabitants. One core aim of this chapter is to provide a broader historical and relational context for understanding present-day development initiatives, grassroots resistance and geopolitics. To achieve this, I draw primarily on local authors to demonstrate how there has been a growing trend in recent years toward recognizing Nepal's own indigenous technologies and social institutions as a source for supporting an urban civilization that has endured for millennia in the Kathmandu Valley. Ancient water systems that date back more than 2000 years have provided sustenance for millennia, with a complex system of surviving operable reservoir ponds, canals and conduits that dates back more than 1500 years continuing to supply household water to hundreds of thousands of residents every day in the 21<sup>st</sup> century. This abundant water supply helped support an urban civilization that was characterized by a highly complex division of labor, eventually leading to greater social stratification rooted in occupational prestige.

After the unification of modern Nepal in 1769, an emphasis on military spending and defense coupled with geographic attributes helped enable Nepal's ruling class to

prevent the Kathmandu Valley and its surrounding regions from ever falling into the hands of European colonial powers. Sandwiched between British India and Qing Dynasty China, the Kathmandu Valley's own ancient water systems and technologies avoided the large-scale disruptions and demise that occurred to ancient technologies in places that experienced the direct impacts of foreign imperialism. Nonetheless, by the 19<sup>th</sup> century, Nepal's political leadership codified longstanding social customs around access to water into a rigid, hierarchical legally-binding code in an effort to gain greater legitimacy among the European colonial powers by adopting a set of punitive laws modeled after France's Napoleonic Code. This code, known in Nepal as the *Muluki Ain* of 1854, reified and entrenched social divisions that had previously been more fluid and flexible, exacerbating social inequalities in ways that are still being felt today. Efforts to emulate European colonial rulers also led to the construction of Nepal's first piped water system to serve the ruling family, ultimately leading to dis-investment in the Kathmandu Valley's ancient water systems. Nonetheless, such water systems continue to be integral to the cultural life and daily practices of many of the Kathmandu Valley's indigenous Newari populations in the 21<sup>st</sup> century, and their long-term survival will likely hinge on the availability of supplemental water for Kathmandu residents in the 21<sup>st</sup> century.

In the second chapter, I draw upon participant-observation and semi-structured interviews with residents of the present-day Kathmandu Valley to examine how social variables such as economic status, geographic location, dwelling type, gender, age, native language and other indicators of identity intersect with various

infrastructural modalities for accessing household water. This chapter thus tells the stories of the daily water practices of residents of the Kathmandu Valley, the impacts of water struggles on labor, social relations and inequalities, and sets the stage for understanding the historical and political context for why the inter-basin transfer of Melamchi water was deemed as necessary in the first place. Narrating these daily water struggles illuminates how water inequalities are projected and mapped onto the lives of citizens in diverse ways, despite common struggles in navigating conditions of water insecurity. In doing so, I draw upon ethnographic evidence to focus on three primary areas of analysis where social variables intersect with physical conditions of water access: first I examine the linkages between economic status, social class and modalities for accessing water, drawing contrasts between wealthier land-holders, renters and squatters; second, I examine the interplay between geographic location and dwelling type and water access, contrasting practices in peri-urban settlements with those practiced by residents of dense urban neighborhoods; third and finally, I conduct participant-observation and interviews with water tanker truck drivers, drawing attention to the shifting role of informal water economies and examining how water access is inextricably linked to the labor of informal economies.

In addressing these three core areas of analysis around water micro-politics and daily practices, I strive to contribute to ongoing debates around moving toward greater water justice by drawing attention to areas where conscious and deliberate policy-planning will be needed if the benefits of piped municipal water are to live up to their full potential in improving the water security of Kathmandu residents. The

availability of more reliable, heavily subsidized municipal water is often touted as something that will reduce inequalities among those who have access to it, and benefit the urban poor especially, given that the wealthiest households are able to make private investments in water infrastructure that are out of reach to the poor (Gurung et. al 2017; Prakash and Molden 2019). Moreover, the availability of supplemental, imported water is also touted as carrying the potential to relieve stress on groundwater resources, even providing indirect benefits to those who live beyond the scope of the piped municipal network (Bajracharya et. al 2020; Ishtiaque, Shrestha and Chhetri 2017). Nonetheless, for specific communities who are excluded from this network, and for residents who rely on the valley's ancient indigenous water systems known as *hiti* in the Newari language, conscious policy efforts are needed to ensure that the benefits of a more reliable urban water supply are shared equitably. Residents of unregistered housing, for instance, already pay a large proportion of their income and often spend hours a day collecting lower-quality water, yet many of these very residents will not receive MWSP water, as wealthier homeowners and renters will. Peri-urban residents who rely heavily on groundwater may see the potential for groundwater overdraft to be halted and reversed, but only if specific policies are enacted to help promote groundwater recharge, such as restoring more of the valley's indigenous reservoir ponds – something that would also help preserve the flow of water to the valley's ancient system of public taps that continue to supply household water to hundreds of thousands of residents every day. Finally achieving water justice also requires attention to the conditions of labor in informal water economies, whose



participants have often taken on substantial levels of debt to buy equipment to sell water to those who need it. Though addressing all of these areas with appropriate policies will likely prove a challenge, the upcoming availability of supplemental water supply should open up new pathways for improving residents' water security.

In chapter 3 I trace the development of elite-driven urban water provision and public infrastructure in present-day Kathmandu and, specifically, the socio-political forces driving the slow and obstreperous implementation of the MWSP. Drawing upon project documents and reports, impact assessments, news reports, histories of Nepal's 1996-2006 Maoist conflict, and interviews with planners, foreign contractors and civil society, I describe how the MWSP has been, since its inception, both politically contested and geophysically precarious. The fieldwork I conducted for this section of the research draws upon interviews from multiple sources, employing a polymorphous methodological approach to reflect critically on the multi-national forces behind elite-driven development processes. Findings from these interviews are further buttressed with additional evidence from contemporary academic literature on Nepal, semi-structured interviews with Kathmandu water users, and by ongoing debates over the role of geopolitics in shaping which development models different states choose at different times. In doing so, one primary goal is to draw special attention to the interplay between grassroots resistance movements, geopolitics between world powers, and domestic political transformations. In particular, I aim to situate the challenges of implementing projects like the MWSP against a backdrop of increased competition between external forces, such as China, India and the United

States, that shape and constrain the pathways for smaller nation-states to implement large-scale infrastructure projects.

The process of planning and implementing the MWSP was inextricably linked to the political transformations and ongoing, iterative processes of state-making in Nepal over the past five decades ever since the first suggestion to bring imported water to Kathmandu was made by the newly created Department of Water Supply and Sewerage in 1973. The emergence of multi-party democracy in 1990 was pivotal in moving forward such plans, occurring shortly after the first pre-feasibility study was performed, and featuring heavily in Nepal's first general election campaign after the collapse of the authoritarian Panchayat system of government. Nonetheless, pressures from above and below constrained the Government of Nepal's intentions to move forward in implementing the project as originally envisioned. The outbreak of a *Jana Yuddha*, or People's War, initiated by a Maoist insurgency challenged the authority of state actors, deliberately targeting large-scale infrastructure projects and prompting a bloody response by state security forces. Pressures from supranational organizations also delayed the project's implementation after the World Bank withdrew its support for the project in 2002, followed by a withdrawal of the government development agencies of Norway and Sweden a few years later. Eventually the Asian Development Bank (ADB) stepped forward to fund the project, but further delays ensued after a 2015 earthquake and subsequent border blockade by India led to a humanitarian crisis in Nepal and contractual dispute between the Nepal government and a foreign contractor. This ultimately resulted in a political and economic shift toward China,

with a Chinese SOE stepping up to complete the Melamchi tunnels. The final section of this chapter examines the role of geopolitics in shaping and constraining the pathways open to planning officials in small, non-aligned countries like Nepal to pursue large-scale infrastructure projects with a particular emphasis on how geopolitical tensions between United States (and India) on the one hand, and China, on the other, have pushed many countries closer to China due to concerns about US intentions and the conditions and strings attached to aid and financing by the US government and US-backed institutions like the World Bank.

The final section of this work returns to the narratives and lives of a few of the core participants in the ethnographic research to examine how their lives have changed over the course of this research. This section also includes baseline information I collected during preliminary trips to the Melamchi Valley that could be used a foundation for subsequent research once the inter-basin water transfers are actively taking place. Assessing the impacts of such transfers on the livelihoods and agricultural production of residents of the Melamchi Valley was originally a core component of this research proposal and could serve as a prescient topic for follow-up work once water transfers reach their full volume. Given that the construction of the Melamchi tunnels is now complete and the first successful water transfer test was conducted at the end of March 2021, it is likely that Kathmandu residents will begin receiving MWSP deliveries during the 2021-22 dry season once remaining testing of the infrastructure is complete. Thus conducting follow-up research on the water justice impacts of these transfers on residents of the Kathmandu and Melamchi

Valleys alike could be initiated soon. In the meantime, I have identified potential areas at the end of each chapter, and the concluding section of this work where conscious and deliberate policy planning could help improve the lives of many research participants while protecting the region's water resources. The Kathmandu Valley is the site of an ancient and enduring urban civilization whose indigenous water technologies continue to provide a viable source of domestic household water to this day. This work is a but a brief foray into the lives, practices, and water policies of those who inhabit the Kathmandu Valley and the technologies that have endured without interruption for millennia.

## **Chapter 1: Indigenous Water Systems in the Kathmandu Valley and Social Relations: A Critical Social and Political History**

*The dream of Melamchi drinking water is now coming true. After the dream wasn't realized in [past administrations], we have now come to a phase to translate it into action.*

(Nepal Minister for Drinking Water, Mani Chandra Thapa)

*What is the present fate of Nepal Mandal developed by the communities over 2000 years? The sugarcane field has been turned into an army parade ground, thus making Kathmandu a thirsty town. Kathmandu itself was prosperous, your slogan of prosperity was just a conspiracy.*

(Author and Activist, Narayan Wagle)

Critics of the contemporary international development paradigm often employ narrow, western-rooted definitions of development, often reducing the broader concept of ‘development’ to a neoliberal project supported by the governments of former colonial powers and buttressed by the interests of global (often western) capital (Brenne 2010r; Escobar 1995; Harvey 2006). More recently another large body of scholarship has re-directed attention toward the role of authoritarian, state-driven development initiatives, often highlighting the rise of China as the world’s single largest source of Overseas Development Assistance (ODA), and revising earlier histories to place front and center the relationship between autocratic political leaders, economic growth and integration into global supply chains (Chang 2012; Lekunze 2020; Nandy 2020). This first set of literature emphasizes the centrality of global neoliberal capitalism as a driving force behind international development, while the latter body of literature emphasizes the role of authoritarian statism in driving contemporary development practices. These two approaches are not necessarily mutually exclusive, with both falling victim to a common set of assumptions that direct attention away from alternative perspectives and examples of what development is and can be. Among these assumptions is the notion that development is a ‘modern’ phenomenon that requires technologies of the industrial revolution, that development is generally capital-intensive, and that development is largely at odds with traditional ways of life and indigenous modes of knowledge (Dahal 2002; Escobar 1995; Shrestha 1998).

A number of scholars and researchers have posited alternative definitions of development and have explored a range of mechanisms and processes for achieving it beyond neoliberal capitalism or state-centered initiatives. As early as 1965, Elinor Ostrom investigated and touted the benefits of collaborative community management as an alternative to state or market forces, drawing on evidence from her dissertation on California's groundwater basins (Ostrom 1965; Ostrom 1990). Similarly, more recent work by Karen Bakker has also rejected both market- and state-driven orthodoxies in studies exploring how the human right to water can be expanded at a community level (Bakker 2007; Bakker 2010). Though both of these authors emphasize that community-based initiatives based on collaborative decision-making and cognizant of equity can be preferable to market or state-centric endeavors, neither directly focuses on what they understand the concept of development to mean, in the first place (Ostrom 1965; Ostrom 1990; Bakker 2007; Bakker 2010).

## “INDIGENOUS” AND “NEWAR” IN NEPAL

-The term ‘indigenous’ (*Adivasi janajati*) in the context of Nepal refers to any ethnic group settled before national unification with its own mother tongue distinct from the Nepali (*khas kura*) language, traditional cultures, written and unwritten histories, and geographical homeland. The Government of Nepal officially recognizes 59 indigenous nationalities, comprising 36% of the total population.

-The term ‘Newar’ is used to refer to the descendants of those who were already living in the Kathmandu Valley prior to its conquest by the Kingdom of Gorkha in 1768 and national unification one year later. The Newar are recognized as the indigenous inhabitants of the Kathmandu Valley and speak their own language in the Tibeto-Burmese family. The Newar are also the only officially recognized indigenous nation in modern Nepal to have their own internal caste hierarchy loosely based on the Hindu *varna*, and are the namesake of the modern English word ‘Nepal’, which historically referred to the Kathmandu Valley.

While Sen and Escobar provide conflicting definitions for understanding development in more modern contexts (see introduction for more details), neither definition transcends the limits defined by industrial modernity and the manufacturing revolution that first emerged in Europe. Drawing upon recent scholarship and historical evidence from Nepal provides a pathway toward a more expansive understanding of development, while also providing a broader historical and relational context in which to situate the present-day case study on urban water provision in Kathmandu (Bakker 2013; Boelens et. al 2016; Mosse 2010; Murthy 2013)

In this section of the dissertation, I draw upon historical evidence from the Kathmandu Valley in Nepal to view ongoing processes of water technology and infrastructure development through the prism of a much longer social history of indigenous water technologies. This enables me to trace the evolution of historical water systems, how such systems were shaped through a combination of internal ingenuity, external politics and migration, and how historical geopolitics was productive of social stratification and inequalities, which became embedded in water infrastructure and daily practices. The Kathmandu Valley is home to an ancient urban civilization whose historical water systems continue to serve as a primary source of domestic water for 10% of households in the present day, while serving as a secondary source for another 10%. These ancient water systems are central to the identity of the valley's indigenous Newari people, and preserving their viability



remains a policy priority for many in the valley today. While mega-projects like the MWSP are widely viewed as necessary to improve household water security, many research participants view the preservation of these older water technologies as of equal or greater importance. By focusing on the role these historic water technologies continue to play in the present-day provision of urban water, I aim to re-orient scholarly understandings of what development is and can be away from one rooted solely in technologies and social practices of the Industrial Revolution, instead placing front and center indigenous technologies and social institutions from Nepal that endure today and providing historical context for current geopolitical pressures that shape infrastructure development in Nepal.

The purpose of this chapter is thus twofold: the first goal is to trace the long history of native water technologies of the Kathmandu Valley to demonstrate how urban development there has been unfolding for millennia in response to both internal and external dynamics; the second goal is to interrogate critically how relationships between political elites, philosophical beliefs, social institutions and particular forms of infrastructure and technologies are productive of, and constitutive with, social stratification and exclusion. Social practices surrounding the collection of water and the building of community spouts and taps have evolved gradually over the centuries. The original (pre-Newar) Kirati inhabitants of antiquity took a communitarian approach to urban infrastructure construction, as did later generations of various Newari dynasties that placed a premium on public water infrastructure that was free

and accessible to all. In more recent centuries, external geopolitical pressures coupled with an increasingly complex division of labor has led to greater social stratification and the adoption of new technologies for elites, undermining the viability of the Kathmandu Valley's own indigenous water systems. The inter-basin transfer of water from the neighboring Melamchi Valley has been touted as one way to increase the water security of Kathmandu Valley inhabitants. While the potential benefits of inter-basin water transfer are widely supported among Kathmandu Valley residents, so too is the preservation of the Valley's own indigenous systems of reservoirs, canals and conduits. Given the specter of a rapidly changing climate and the benefits that free public taps provide for the poor and marginalized, maintaining multiple sources of urban water supply is a proposition that has strong public support across multiple sectors of Nepalese society.

The remainder of this chapter draws heavily on Nepalese perspectives and literature, interviews with scholars and historians who work in the Kathmandu Valley, and analysis of classical texts from antiquity written in Nepal and South Asia. I conducted 24 interviews with nine local professors and historians, including faculty at the Centre for Nepali and Asian Studies (CNAS) at Tribhuvan University in Kirtipur, Nepal, faculty of architecture at Tribhuvan University and Tri-Chandra College, in addition to interviews and conversations with 11 graduate students with expertise in Nepalese history, architecture and Sanskrit history and literature. Drawing on these local and indigenous perspectives allows me to examine more deeply the local histories and

socio-cultural contexts within which contemporary water rights and infrastructure projects like the MWSP are embedded, addressing a call within the Anglo-American water justice literature to interrogate more seriously how present-day projects and power relations have been shaped by centuries of history (Boelens 2013; Mosse 2010; Murthy 2013)..These local histories also provide a more deeply-rooted context for understanding the geopolitics and grassroots resistance of the moment by drawing attention to how historical pressures from powerful neighbors to the south and north have shaped the development trajectory of the Kathmandu Valley's urban water systems and social relations over the centuries.

The first section of this chapter provides a social and architectural history of ancient (pre-Newar) Kirati water technologies that remain viable today. These indigenous technologies of the hills, which include reservoirs, canals and conduits, were expanded and hybridized after the arrival of the Sanskrit-speaking Lichchhavi people nearly 2000 years ago in what were the first documented instances of a multi-ethnic urban society inhabiting the Kathmandu Valley. This fusion of Kirati and Lichchhavi elements played a crucial role in forging what would later come to be known as Newari culture. This section thus traces the subsequent development of the *hiti*, or public stone taps and the increasing social stratification that arose in tandem with increasing specialization in the division of labor as through successive waves of political dynasties as a result of the Kathmandu Valley's position at the crossroads of two major trade routes. Although the influence of regional trade and external

influences led to the emergence of social stratification over time, political leaders throughout most of the Kathmandu Valley's history invested heavily in public water infrastructure creating public water systems that have endured for millennia and that continue to provide household water for hundreds of thousands of people in the present day.

The final section of this chapter examines how social relations and urban water infrastructure evolved in the Kathmandu Valley in the period after Nepalese unification in 1769. Although the newly unified Kingdom of Nepal remained politically independent throughout this period, its geographic location along the peripheries both of British India and Qing Dynasty China shifted the political focus away from spending on urban infrastructure and toward power politics and military spending. Moreover, efforts by the Rana Dynasty to acquire recognition and legitimacy in the eyes of European colonial

---

## WATER AND INEQUALITY IN NEPAL

Historian Amish Raj Mulmi (2021) opines that the hierarchy of *pani chalne* and *na chalne jats* (water acceptable and unacceptable peoples) is one of the few primary threads that unites Nepal's peoples. State-sanctioned segregation based on perceived water worthiness (purity) was formally abolished in the 1950s roughly one century after the Rana rulers codified it into a rigid legal hierarchy. More broad-based anti-discrimination laws were introduced in 2008 along with an affirmative action system of quotas to ensure that *pani na chalne jats* (water impure peoples) have access to government jobs and universities. Although the practice of segregation at public taps no longer commonly takes place in the Kathmandu Valley, members of many social status groups that were historically classified as 'water impure' continue to report frequent instances of discrimination, while members of such groups continue to experience lower levels of education and health outcomes than those from historically 'water pure' groups.

powers led to a rigid, hierarchical codification of longstanding social inequalities that continues to cast a long shadow into the present day. Although the political leaders of the European colonial era were successful in maintaining Nepal's political independence, many of their policy priorities sharply exacerbated existing social inequalities, while a focus on building European-influenced infrastructure to serve the ruling families led to a divestment in the support and maintenance of ancient water technologies that served the broader public. While public opinion in contemporary Kathmandu overwhelmingly favors expanding access to indoor piped water, so too is public support for maintaining indigenous water systems that continue to provide water for hundreds of thousands of residents every day.

*Indigenous ingenuity, external influences: the native water systems of the Kathmandu Valley*



*(Figure 1.1 ancient hiti continue to provide household water for hundreds of thousands of residents)*

A deeper dive into the history of the Kathmandu Valley's indigenous institutions for urban water management reveals a complex and fluid history of centuries of interplay between infrastructure built by authoritarian political leaders and collective, community-centered institutions for managing the Valley's urban drinking water and irrigation infrastructure. Although many of the Kathmandu Valley's historical technologies for supplying urban water bear superficial resemblance to ancient water systems found elsewhere in South Asia, many of these technologies evolved and developed independently in what is now the Kathmandu Valley, drawing on the practices and knowledge of ethnic groups that have inhabited what is now Nepal for more than 2000 years. In this section, I investigate renewed attention within the academic literature toward Nepal's own indigenous systems of urban water management that have evolved gradually over the centuries. Though decades of official neglect coupled with rapid population growth and climate change have threatened the long-term viability of such urban water infrastructure, these systems nonetheless endure, serving as a primary source of water for thousands of households in Kathmandu today, and as a secondary source for countless more.

While much of the earlier literature published in English by scholars of Nepal focuses on framing Nepal's trajectory of development through the prism of western definitions and concepts (Dahal 1998; Dahal 2002; Gyawali 1994; Shrestha 1998), there has been an increasing focus in recent years on Nepal's own indigenous technologies and ways of knowing (Bhandari 2014; Dahal and Timisina 2006; Tiwari

2016). For example, Bhandari's (2014) study of Civil Society Organizations (CSOs) in Nepal acknowledges that while formal CSOs, like the NGOs found in many western countries, did not exist there until the latter half of the 20<sup>th</sup> century, broader concepts of civil society and collective action have been an integral part of Nepalese (and its progenitors') literature, artwork and society dating back more than 2000 years. One of the main claims from this study is that while there is a relatively short history of formal civil society in modern Nepal, informal indigenous organizations have been present for millennia; the major role of civil society has changed very little, rather its the modality that is changing (Bhandari 2014: 178-179). Despite a reluctance of many earlier researchers to categorize longstanding forms of collective action in Nepal through the lens of CSOs, more recent research has emphasized that many formal organizations in the contemporary period represent more of a continuity of longstanding traditions than a break with them (Bhandari 2014; Dahal and Timisina 2006; Tiwari 2016).

Though the underpinnings of civil society in the Kathmandu Valley date back millennia, they also reflect an amalgamation of discrete and distinct cultures and civilizations that have shaped the region's growth over the centuries. Dahal and Timisina (2006) trace the origins of Nepal's civil society back to the Vedic era roughly 4000 years ago. They contend that civic life in what is now Nepal was already established by the Vedic age when "*dharma* (institutional duties and role[sic]), *shashtras* (moral and legal treatises), and *shashtartha* (philosophical

discourses)” shaped the relationships between rulers and subjects, established norms of governance and placed an emphasis on public welfare (Dahal and Timisina 2006:19-20). Many longstanding charitable organizations and public trusts in contemporary Nepal trace their origins back to these concepts. Despite the prominent role that Sanskrit-origin philosophical concepts play in modern-day Nepalese thought, however, they are but one piece of the multi-ethnic, multi-lingual mosaic of the Kathmandu Valley’s history. Indeed, much of the Kathmandu Valley’s native water technologies and infrastructure were already well-established by the time that larger numbers of speakers of the Indo-Aryan (Sanskrit-based) languages began to settle there (Interview 4/14/2018; Tiwari 2016).

What one well-established professor at the Centre for Nepali and Asian Studies (CNAS) told me was that “to understand the peoples and culture of the Kathmandu Valley, it is important to first understand from whence their ancestors came” (Interview 4/14/2018). Contemporary Nepal has over 100 active, living languages, and far more officially recognized ethnic, caste and status groups (Nepal Census 2011). Nearly all living languages spoken belong to either the Indo-Aryan branch of the Indo-European language family or the Tibeto-Burmese branch of the Sino-Tibetan family of languages (Interview 4/16/2018; Nepal Census 2011). Native speakers of these two language families residing in the Kathmandu Valley are believed to have originally migrated there from the south and west, or from the north and east, respectively (Interview 4/16/2018). Settlers representing both of these language



families have been present in what is now Kathmandu, dating back to antiquity (Interview 4/14/2018; Tiwari 2016). Khanal (2019:45) writes that the Himalayan region historically has been the meeting point between “northern Lamaism and southern Brahmanism”, and is somewhat unique among modern South Asian nation-states in that it lies at the periphery of two distinct ethno-cultural regions, but at the core of neither – something that continues to influence Nepal’s relations in the present day.

Figure 1.2, depicted on the below, depicts the breakdown of major language families in South Asia. The Kathmandu Valley itself lies directly along the boundary of where Indo-Aryan and Tibeto-Burman (Sino-Tibetan) language families meet. Native inhabitants of regions immediately to the north and east of the Kathmandu Valley speak languages belonging to the Tibeto-Burman family of languages, while Indo-Aryan speakers are native to the regions to the south and west. Both the ancient Kirati and modern Newari languages, both native to the Kathmandu Valley, are classified in the Tibeto-Burman family, though the latter is more heavily influenced by Sanskrit, and even Persian, vocabulary. The modern-day lingua franca of the valley, Nepali or Gorkhali, belongs to the Indo-Aryan family and was first introduced to the valley during the conquest and unification of Nepal by the Kingdom of Gorkha during the 18<sup>th</sup> century (see pp. 98-104 for more details on Nepali unification).

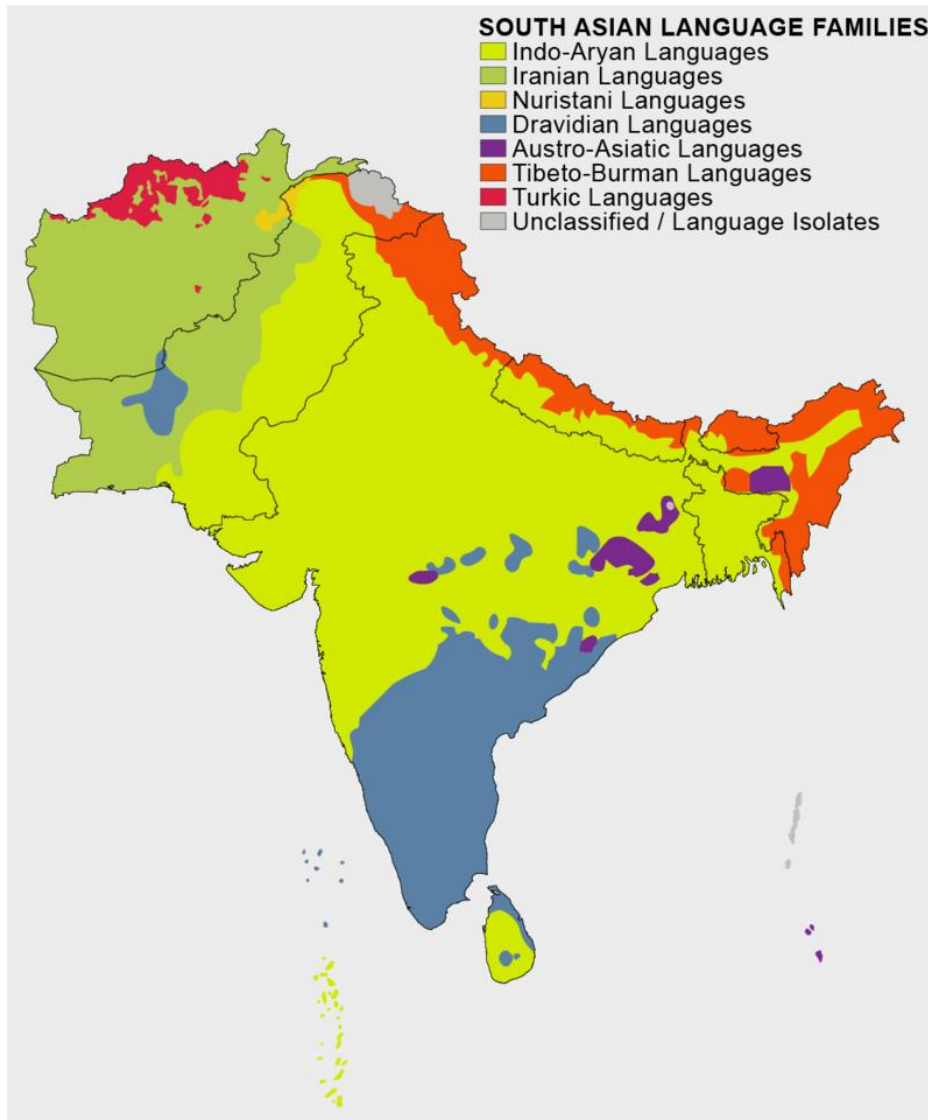


Figure 1.2<sup>1</sup> ((above) Language families of South Asia)

Some of the earliest recorded groups to have inhabited the Kathmandu Valley were the Kirati people, whose native tongue belonged to the Sino-Tibetan family of

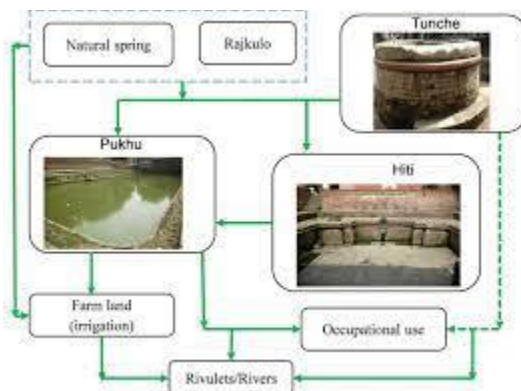
---

1 The distinctions between language families and branches of language families depends on the particular taxonomic features used to categorize different tongues. Although Figure 1.2 differentiates between Indo-Aryan, Iranian, and Turkic languages, many linguists classify all three of these as branches of the Indo-European language family (Khanal 2019; Interview 4/16/2018). These three branches are believed to stem from archaic proto-languages distinct from the Sino-Tibetan, Dravidian, and Austro-Asiatic groups (Ibid)

languages, and the Lichchhavi, who are believed to have migrated northward from the Indo-Gangetic plains roughly 2000 years ago (Khanal 2019; Tiwari 2016). Many of the earliest archaeological inscriptions found in the Kathmandu Valley were left behind by the first wave of Lichchhavi settlers, yet some of these inscriptions describe urban water systems and technologies built by the Kirat that had already been present for generations when the first Lichchhavi arrived from what is now India (Tiwari 2016). Indeed the Lichchhavi had migrated from an urban civilization to the south that had already developed its own technologies for wastewater disposal, such as terracotta ring wells, yet the design of these technologies was best suited for flat terrain where absorptive soil is more abundant (Ibid). While it remains unclear precisely how long Kirati water systems had been in place before the arrival of the Lichchhavi – the Kirat did not adopt a written script for their language until much later on – all the available evidence suggests that the earliest Lichchhavi to live in the Kathmandu Valley incorporated Kirati water technology into their own settlements, given its advantages in the hilly terrain (Interview 4/25/2019; Tiwari 2016).

The earliest settlements in the Kathmandu Valley were located on the tops of ridges and hills and drew water from rain-fed reservoir ponds located in the higher part of the settlement (Interview 4/25/2019). Because these systems relied on gravity the very highest elevations in settlements would typically be reserved for rain-fed agriculture with homes and public taps below. In larger settlements, reservoir ponds were sometimes fed by canals, which were also used to move water to distribution

outlets kept in sunken pits (Tiwari 2016). Within the first century after the arrival of the Lichchhavi settlers to the Kathmandu Valley, further specialization of the water system appears to have taken place, as knowledge and technologies native to the Gangetic Plains were merged with older Kirati water systems. In particular, the reservoir and canal system, known as *tilamaka* in the Kirati language, or *rajkulo* in Nepali, appears to have been combined with what the Lichchhavi of the plains called *pranali jaladroni*, a similar, yet technologically distinct, system of canals and conduits (Interview 4/25/2019; Tiwari 2016). Though the use of reservoir ponds and canals, in and of itself, was widespread across other urban societies in South Asia, combining such systems with sunken pits was quite rare, suggesting that this particular technology was indigenous to the Kirat, and later modified during subsequent waves of settlement to the region. Figure 1.3 depicts a schematic of an indigenous water system, although the very earliest systems were likely less complex than the one depicted below.



(Figure 1.3 Natural springs transfer water through canals both to ponds (*pukhu*) and sunken pits (*tunche*), which then feed the *hiti*, or public taps. Excess flows from the

*hiti historically ran into lower ponds (pukhu) that supplied water for livestock and irrigation. Any water not used for these purposes would then run into streams and rivers or would recharge the groundwater aquifer)*

Though details of many of these earliest urban water systems in Nepal remain incomplete, records of contemporaneous water technologies in what is now northern India and Pakistan further buttress the claim that the oldest water technologies of the Kathmandu Valley developed endogenously. Although deep pit water systems known as *vavoli* have been present in northern India for centuries, these systems are documented to have evolved from wells that were present in the Gangetic Plains since antiquity (Interview 4/25/2019). Moreover, the adoption of *vavoli* did not become widespread until well after the Lichchhavi inscriptions described a sunken pit system that was connected to canals and a reservoir, something that distinguishes the ancient Kirati technology from those found on the plains of northern India (Interview 4/25/2019). The *vavoli* must be dug deep enough to access sub-surface water and groundwater; it is not a system of water in flow (Saddiqi 2013). In contrast, the sunken pits of the Kirat were fed by rainwater flowing from a reservoir, through canals and channels and into a sunken pit, moving water across often long distances. Though aesthetically similar in appearance, the *vavoli* and the Kirat's sunken pits are quite distinct technologically, as the former functions as a pond whose water is filtered by rock and soil while the latter is a system of flowing surface water that is held beneath the surface before distribution (Saddiqi 2013; Tiwari 2016). The design of the Kirat's indigenous water system is highly durable, with millennia-old *tilamaka*,

or canals, connected to conduits and pits continuing to supply water to Kathmandu denizens even today.

Some of the most pertinent clues as to how the Kathmandu Valley's earliest water systems developed come from linguistic analysis of how the Lichchhavi's Sanskrit-based inscriptions about Kirati water systems developed over time (Interview 4/27/2019; Khanal 2019; Tiwari 2016). Other clues come from linguistic analyses of the evolution of the modern Newari language – a Sino-Tibetan tongue that evolved from ancient proto-Kirati and gradually incorporated more Sanskrit-based vocabulary, and influences from other regional languages over the centuries (Interview 4/27/2019; Khanal 2019). In the contemporary era, modern Newari is considered the indigenous language of the Kathmandu Valley, though it is now has minority status in multi-ethnic Kathmandu (Interview 4/27/2019; Khanal 2019; Nepal Census 2011). Early Lichchhavi inscriptions indicate that the ancient Kirati terms for reservoir, canal and conduit were modifications of earlier words for pond, river and waterfall respectively (e.g. *la-kha* → *lakhamaka*; *ti-la* → *tilamaka*; *tila-hi* → *hiti*) (Interview 4/27/2019; Tiwari 2016). Though many of these terms are now archaic, as the language has evolved over time, the term “*hiti*” continues to be used today in modern Newari to refer to the communal water spouts that remain ubiquitous throughout the Kathmandu Valley (the Nepali language equivalent of *hiti*, ‘*dhara*’, has also changed little from the Sanskrit term for communal tap used by the Lichchhavi) (Interview 4/27/2019).

Figure 1.4, (pictured below) depicts *Manga Hiti*, also known as *Dhunge Dhara* in the modern Nepali language. Completed in 627 *Vikram Sambat*, or A.D. 550 in the Christian calendar, *Manga Hiti* is the oldest viable communal water spout in the Kathmandu Valley. Although concerns about water quality and quantity have risen with the Valley's recent rapid urbanization, hundreds of residents continue to collect water here on a daily basis with dozens coming each day, even during the period of COVID-19 pandemic restrictions.



*Figure 1.4 Manga Hiti, Patan, Nepal*

While the technology behind the Kathmandu Valley's ancient water spouts is based largely on indigenous Kirati water systems design, many of the aesthetic elements, including the engravings on the spouts themselves reflect cosmological symbols and beliefs brought to the Valley during the Lichchhavi period. Little remains known about the specific details of when and how the Sanskrit speaking Lichchhavi first arrived in the Kathmandu Valley. Yet, many architectural features of some of the oldest surviving spouts indicates that within a couple centuries of the first permanent

Lichchhavi settlements there, significant elements of their philosophy and religious beliefs had become incorporated into public works and architecture, such as the *Manga Hiti* (Interview 4/25/2019). For instance, the engraving most prominently seen in the foreground of the spout in Figure 1.4 (above) depicts a *makara*, a mythological sea creature in ancient Hinduism whose engravings are commonly found guarding the entry ways to throne rooms and temples (4/25/2019). Such architectural imagery was once commonplace across southern Asia with examples of *makara* carvings found all the way from Afghanistan in the northwest to the temples of Angkor Wat and the island of Bali to the southeast, reflecting Kathmandu's historical position at the intersection of trade routes. Perhaps more importantly, the particular features of the *makara* on *Manga Hiti* in Kathmandu depict the *vahanam*, or vehicle, of the river goddess *Ganga* (eponymous with the Ganges River), strongly suggesting that the architectural design was heavily influenced by close cultural ties with the Gangetic Plain to the south (Interview 4/25/2017; Neupane 2015). Moreover, these traditions hold that non-human nature is integral to keeping the water flowing sustainably with a longstanding belief that snakes pursue frogs in the canals, thus preventing the canals from becoming clogged and allowing the water to flow continuously. To this day, *Naga*, the snake god is worshipped every year to honor the snake's role in maintaining the water system.

While the historical patterns of Lichchhavi settlement of Kathmandu and the particulars of the Lichchhavi's social relations with the Kirat are not fully clear, all



the available evidence does suggest that the Lichchhavi and their descendants had becoming increasingly dominant politically by the time the *Manga Hiti* was completed (Neupane 2013). In his work tracing the historical development of indigenous water systems in the Andes mountains of South America, Boelens (2014: 235-238) extends existing analyses of hydro-social cycles to the “hydro-cosmological cycle” to contend that elites mobilize metaphysical beliefs to enroll their subjects into a dominant discourse and governance system thereby maintaining their own power. Like the ancient water systems in the Andes, one possible speculation is that Lichchhavi rulers mobilized their own cosmological beliefs to affirm their own power and dominance over the polity, exploiting water metaphysics to reinforce disciplinary power strategies (Boelens 2013). While such explanations may resonate strongly with scholars well-versed in the disciplinary training of Foucauldian critique, and disciplinary expertise with case studies in the Americas, a deeper engagement with historical literature from Nepal complicates explanations that rely heavily on western concepts of power-knowledge and domination of a sub-altern. Instead, an exploration of contemporary debates within Nepal on the influence of Sanskritic cultures vis a vis Tibeto-Burmese ones provides a more compelling framework for understanding the broader historic and relational context within which present-day development initiatives and foreign relations take place (Mosse 2010)

One complicating factor in trying to analyze power relations between the Sanskrit-speaking Lichchhavi and Kirat in the Kathmandu Valley during antiquity is that it

appears that many Kirat had already had significant exposure to belief systems associated with Indo-Aryan civilization long before the period of Lichchhavi settlement (Dahal and Timisina 2006; Neupane 2015). Indeed the ancient Sanskrit epic Mahabharata, which was written nearly five centuries before the Lichchhavi period, specifically mentions the Kirat kingdom, which at that time spanned an area greater than modern day Nepal (Mahabharata 12-64; 12-206). Even in Kathmandu today, many locals – especially those from the non-Sanskritic Newar and Kirat communities – recognize the mythological, semi-divine character of Barbarik from Mahabharata as Yalembar, the first Kirat king who reigned roughly 28 centuries ago (Interview 8/25/2018). A large sculpted mask of Yalembar is displayed prominently at Indra Chowk in central Kathmandu near the entrance to the medieval royal palace at Hanuman Dhoka. While numerous conversations have made clear that the exact meanings of such ancient historical literature remains inchoate and contested, what is clear is that there has been significant and frequent contact between Indo-Aryan and Sino-Tibetan peoples of what now is Nepal longer than there has been written history.

Figure 1.5 below depicts a map of the area referred to as Kirata in the ancient epic, *Mahabharata*



*(Figure 1.5 ancient boundaries of Kirata were not clearly defined, but were understood by ancient Sanskrit speakers to comprise much of the Himalayan highland region )*

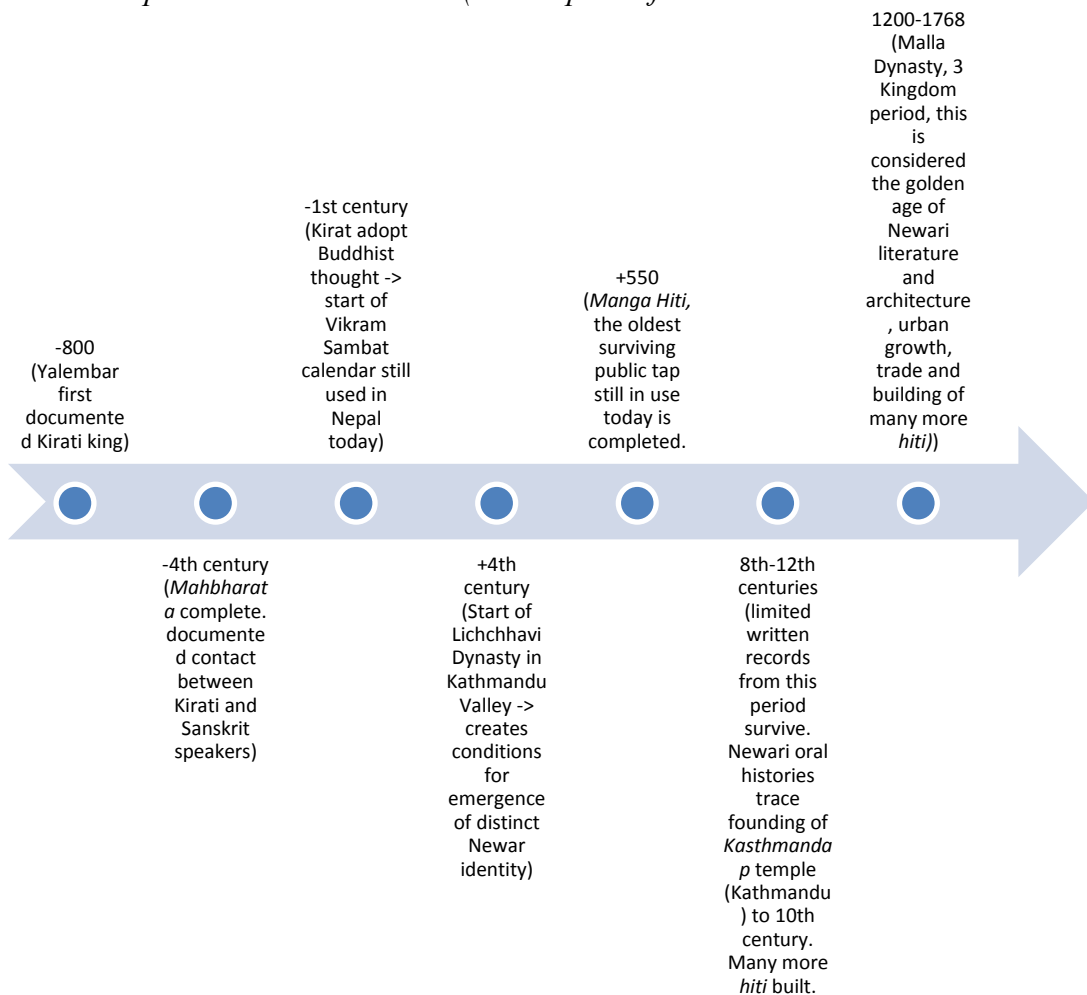
Another significant pre-Lichchhavi source of Kirati exposure to what were then largely Indo-Aryan belief systems rooted in the Vedic tradition came through the diffusion of early Buddhist thought northward and eastward. The historical figure of Prince Siddhartha, later known as the Buddha, was born in Lumbini in the Shakya Kingdom, which today is part of Rupandehi district, Nepal. Although Siddhartha himself was a native speaker of a dialect of Sanskrit, and well-versed in the philosophy of the Vedas before he began his own journey, the Kirat people, then living along the densely forested slopes that adjoin the plains-based Shakya Kingdom, were among the first anywhere in the world to adopt what is now known as Buddhist thought into their own belief systems (Dahal and Timisina 2006; Dutt 1966). Many historical records indicate that some of Siddhartha's own sojourns to the forest to meditate indeed took place in what was most likely territory claimed by the Kirat Kingdom (Dahal 2003). The ancient Kirat, and much later the Lichchhavi and

Newari people also, adopted elements of Buddhist thought accretively into their own indigenous belief systems, forming a cosmological view best characterized by its embrace of syncretism and the practicing of traditions and rituals from multiple origins. For this reason, by the time first Lichchhavi settlers reached what is now Kathmandu early in the first millennium of the western calendar, both the Lichchhavi and the Kirat already shared a common set of philosophical concept and values, such as the *Panch Shila* (Five virtues or five values) (Dahal and Timisina 2006).

Although a more detailed exegesis of ancient Sanskrit and Buddhist texts remains outside the scope of this research, there are numerous examples from classic works of this periods that suggest sustained interactions, and inter-marrying of elites, between the Indo-Aryan peoples of the plains and the Sino-Tibetan speaking Kirat of antiquity (Dutt 1966; Mahabharata 12-206; Neupane 2015). Classical Sanskrit texts that include mention of the Kirat include Manava-Dharamsastra, also translated as Manusmirti, and Bharavi's Kiratarjuniyam, the latter of which makes specific mention of personal relations between Kirat and Indo-Aryan political leaders (Interview 8/25/2018). An even earlier collection of Sanskrit religious mantras, the Yajurveda, first written nearly 3000 years ago also makes reference to Yalembar, often believed to be the first Kirati king (Dutt 1966; Interview 4/25/2019). Ancient copies of this Sanskrit text have been found well beyond the Hindu-populated lowlands, with original manuscripts found as far afield as Tibetan Buddhist temples in what is now administered as the Tibetan Autonomous Region of the People's

Republic of China (Ibid). These textual examples from antiquity pre-date the permanent settlement of the Sanskrit-speaking Lichchhavi in the Kathmandu Valley, suggesting ongoing and iterative periods of sustained contact between Kirati and Sanskrit speakers throughout many earlier centuries.

*Figure 1.6 below provides an overview of key events in the social history of the Kathmandu Valley prior to Nepalese unification in 1769. In recent years, historians and educational curricula in Nepal have re-emphasized the contributions of Nepal's own indigenous peoples, turning away from a solely Sanskrit-centric understanding of Nepal's history at a time when policymakers re-consider Nepal's bilateral relationships with India and China (see chapter 3 for more details*



Earlier western scholarship on South Asia does suggest that after centuries of intermittent contact between Kirat and Sanskrit speakers, the Lichchhavi ultimately conquered much of what is now eastern Nepal, imposing their own beliefs and values on the indigenous Kirat (Dutt 1966: 29-32). Indeed the earliest written inscriptions and manuscripts found in the Kathmandu Valley are attributed to the early Lichchhavi exclusively (Dutt 1966; Tiwari 2016). Later Sanskrit manuscripts also make references to the Lichchhavi settlement and conquest in the Kathmandu Valley after the Lichchhavi were displaced from their ancestral homeland in what is now the Gangetic Plains of northern India. For instance, the medieval Sanskrit genealogy *Pashupati Purana* describes how the Lichchhavi established their own regime by wooing the Kirat with gifts and sweet words and then defeating them in war (Pokhrel 2017). Broadly similar sentiments can be found in the later Gopal genealogy *Himbatkhanda* (Pokhrel 2017). Nonetheless, the approximate dates of Lichchhavi arrival, along with the names and the number of erstwhile Kirat kings vary widely between different accounts of the Lichchhavi's settlement of Nepal. Similarly, details about the size and scope of the Lichchhavi exodus from the Gangetic Plains remain unknown.

How extensively the Sanskrit-speaking Lichchhavi actually exerted effective control over the region remains actively contested today. Many younger Kirati, Newari (and also Rai, Limbu and Gurung) students, scholars and activists contend that the influence of ancient Sanskrit speakers in early Kathmandu has been overstated by

previous work, especially given that indigenous ethno-linguistic groups had not yet adopted a written script by the early Lichchhavi period. This has prompted earlier scholars to rely almost exclusively Sanskrit language manuscripts to assess the state of relations between the Lichchhavi and indigenous peoples of the hills (Interview 4/27/2019; Interview 4/29/2019; Mongol National Organisation (Nepal) 2019). These assertions are supported by more recent linguistic analysis of the Kathmandu Valley, and even early Nepal census data, which both suggest that speakers of Indo-Aryan, Sanskrit-based languages only became a majority of the Valley's population in the latter half of the 20<sup>th</sup> century, due in-migration from points further west in contemporary Nepal (Khanal 2019; Nepal Census 1951; Nepal Census 1981; Nepal Census 2011). Even after the unification of modern Nepal in the latter half of the 18<sup>th</sup> century and the adoption of *Khas Kura* – the Sanskrit-derived modern Nepali language – by the royal court in Kathmandu, an overwhelming majority of Kathmandu Valley denizens continued to speak languages of the Sino-Tibetan family for nearly two more centuries (Khanal 2019). This suggests the cumulative influence of earlier waves of Sanskrit-speaking settlers and invaders on the Kathmandu Valley's language and culture may well have been more limited than older Sanskrit manuscripts suggest.

Though the scope and extent of Lichchhavi domination over Kirati peoples remains unclear and contested, it is well-established that many of the Kathmandu Valley's oldest infrastructure and water systems are rooted in Kirati technologies with later

Lichehavi and other Indo-Aryan influences (Interview 4/25/2019; Tiwari 2016). Moreover, the Kirat retained more autonomy over lands to the east of the Kathmandu Valley, leaving much of their culture and customs intact through successive waves of later invasions of Kathmandu proper (Interview 4/25/2019; Interview 4/27/2019). Even today, the Government of Nepal defines the indigenous Kirati religion, known as *Kirat Mundhum*, as its own separate census category for religious identification apart from either Hinduism or Buddhism (Nepal Census 2011). Despite this, many modern day Kirat practice some form of Hindu and Buddhist rituals, in addition to observing their own festivals and folk beliefs. Likewise, one of the oldest Hindu temples in the Kathmandu Valley, *Pashupatinath*, contains ancient idols of *Birupakshya*, believed to be the divine ancestor of the Kirati kings and a progenitor of *Kirat Mundhum*. Near the entryway to the temple stands additional *hiti*, dating back to the medieval period, which like the idol inside serves as an example of a hybridization of Indo-Aryan and Kirati beliefs and technologies (Tiwari 2016).



(Figure 1.7 depicts a surviving canal that channels spring water into reservoir ponds, pits and *hiti*)



Later water technologies and infrastructure native to the Kathmandu Valley continued to incorporate hybridized systems and cosmology into their design. The ancient Kirati water technologies of *lakhamaka*, *tilamaka*, and *hiti* (reservoir, canal, conduit/spout) continued to serve as the basis for a growing system of (semi-)public<sup>2</sup> taps that supplied domestic, household and ritual water needs. One reason these basic architectural elements continued to endure over the centuries was that they not only used gravity to channel water from reservoirs to deep sunken pits, they also were able to harness gravity to filter the water and control and regulate its flow as it came through the spouts (Tiwari 2016). This was achieved by constructing a chain of conduit pits with each following conduit at a lower level than the last behind which stood a maze of brick and tile, causing the water first to circulate and thus consequently filtering out silt and sediment before it reached the spout (Interview 4/25/2019). Some of these design elements were perfected during the Lichchhavi period when the design of the sediment filtration systems began to become more intricate and complex (Interview 4/25/2019). Nonetheless, the basic underlying architecture, first conceived by the indigenous Kirat, has proven to be remarkably durable with multiple taps in the Kathmandu Valley still viable after more than a millennium of daily use by the local population. Even with water diverted from some of these systems during the early 20<sup>th</sup> century to meet the needs of the political leaders of the day, *hiti* like the *Manga hiti* in Mangal Bazar neighborhood continue to

---

2 While taps were generally provided as a public good, social restrictions on who could use which taps at which times were in place in some locations. A more detailed analysis of some of these social restrictions, and how such restrictions evolved over time will be found later in this chapter.

provide basic household water to local residents after nearly 1500 years of continuous, daily use (Interview 4/25/2019, Participant Observation 2017-19).

The number of *hiti*, or community taps continued to proliferate throughout the Lichhavi period and during subsequent dynasties, in part due to increased trade and population growth, but also largely because of cosmological beliefs associated with building *hiti* in the first place.

Longstanding cosmological beliefs about the metaphysical benefits of building *hiti* compelled many rulers and wealthy citizens to donate money and time toward the cause of building and maintaining community water infrastructure (Interview 4/30/2019; Singh 2011). More critical analysis of similar beliefs elsewhere also suggests that such infrastructure projects may have served as a performative act to curry favor in the eyes of the broader population, allowing local elites to maintain their grip on power through mobilizing hydro-cosmological discursive frames (Boelens 2013). Nonetheless, in-depth interviews with multiple Nepalese respondents suggested that fear of and respect for the supernatural played a significant motivating role in the proliferation of *hiti* across the Kathmandu Valley, with such beliefs enduring today among a significant share of the population (Interview 2/7/2018; Interview 2/15/2018; Interview 4/30/2019; Neupane 2015; Singh 2011). One specific belief associated with the *hiti* is that funding and building a communal tap carries with it spiritual deliverance for the next seven generations of one's descendants,

increasing the likelihood that the offspring of the *hiti*'s patron will achieve material wealth in life and liberation in death (Interview 2/15/2018; Interview 4/30/2019; Neupane 2015). Written records of such beliefs date back to the Lichchhavi period and permutations of such beliefs continue to endure today through the operation of Kathmandu's *guthi* – ancient social institutions that continue to maintain many of the Kathmandu Valley's *hiti* in the present day (Interview 2/15/2018; Interview 4/30/2019; Neupane 2015).

Although written records of the historical origins of the *guthi* are limited, oral histories told by participants leading *guthi* in the 21<sup>st</sup> century suggest these institutions, sometimes translated as 'social trusts', have existed in the Kathmandu Valley in some form for at least 25 centuries (Interview 2/15/2018; Interview 4/30/2019; Neupane 2015). These ancient and robust social institutions evolved concomitantly alongside the development of the *hiti* and other urban infrastructure, confounding the notion that Nepal lacked formally organized civil society until quite recently (Dahal 2002; Interview 2/15/2018; Shrestha 1998). In the present day, the *guthi* are considered an integral social institution to the indigenous Newari

community of the Kathmandu Valley<sup>3</sup>, and while their influence has diminished somewhat in recent decades, they continue to play a critical role in social welfare and historical preservation, especially in the more rural parts of the Kathmandu Valley (Interview 4/30/2019; Neupane 2015). Efforts in 2018 to bring the *guthi* under the supervision of federal government authorities resulted in mass protests accusing the government of cultural genocide against the valley's indigenous people, leading to the bill being tabled and government ministers resigning. Thus the history these ancient social and technological continues to shape domestic politics strongly in the present day, making a deeper understanding of this history crucial to implementing major new initiatives.

Many of the specific religious beliefs historically associated with building *hiti* also apply to bequeathing land to the *guthi*, although this practice has become far less common in recent decades owing to the increasing scarcity of open land (Interview 4/30/2019). Much of the land that was bequeathed to the *guthi* over the millennia serves as open-access agricultural plots, allowing poor and landless members of the community space to till and grow their own crops. A small share of production from

---

3 While the ancient Kirat were the first documented inhabitants of the Kathmandu Valley, the term "Newar" is used to refer specifically to present-day descendants of those who were living in the Kathmandu Valley before its conquest by the Gorkha Kingdom in the 18<sup>th</sup> century – an event that led to the unification of modern Nepal. The Newari language is as a descendant of the ancient proto-Kirat, as are the modern Kirati, Rai and Limbu languages. Due to the Kathmandu Valley's uniquely long history of urban civilization in what is now Nepal, and stronger identification with the Hindu *varna* by the Valley's indigenous population, most indigenous inhabitants of Kathmandu self-identify as 'Newar', while the native peoples of the adjacent hilly region directly to the east continue to self-identify as 'Kirat', 'Rai' and 'Limbu', all four of which are categorized as *adivasi janajati*, or indigenous peoples, by the Nepal Census.

these plots is used to feed members of religious orders, while the laborers keep the overwhelming share of what they grow (Interview 2/15/2018; Neupane 2015). These agricultural plots are often integrated with ancient irrigation canals and technologies, with the aim of boosting the food security of the poorest and most vulnerable members of the community (Interview 2/15/2018; 4/30/2019).

Although many of the indigenous architectural and cultural practices of the Kathmandu Valley ostensibly were conducted with the aim of social harmony and providing for the marginalized and vulnerable, there did exist a number of inherent exclusions and social restrictions surrounding access to urban infrastructure. For instance, while ancient Kirat water systems were founded on a durable architectural design that has allowed them to endure over the centuries, other later design elements of the *hiti* were produced specifically to allow for social differentiation between different status groups among the broader population (Interview 4/27/2019; Tiwari 2016). As mentioned earlier in this section, the aesthetic design on the spouts of the oldest surviving *hiti* depicted mythological and religious imagery most often associated with the Lichchhavi's ancestral home on the Indo-Gangetic plains. Spouts built later in the Lichchhavi period and during successive dynasties incorporated design elements to maximize distance between the tap and water user to ensure that water collectors of lower social status didn't come anywhere near touching the actual tap (Interview 4/27/2019; Neupane 2015). This suggest that ritualistic notions of water purity (*pani (na) chalne*) were already present several hundred years ago, but

did not evolve into complete segregation until much later in the valley's history/ The ancient Kirat and their modern-day descendants further east in rural Nepal have not historically subscribed to such notions of purity and pollution often associated with the social differentiation of the Hindu *varna*, but within a few centuries of the Lichchhavi's arrival the Kathmandu Valley had developed a highly specialized division of labor, resulting in greater social stratification (Interview 5/2/2019).

With the evolution of a more complex division of labor came greater differentiation between social status groups. These divisions were further re-enforced by metaphysical beliefs of the Lichchhavi elite, and later documented by successive waves of newcomers from outside the Valley (Interview 5/2/2019). Situated along a trade route between the Gangetic Plains to the south and the Tibetan Plateau to the north, merchants in the Kathmandu Valley were actively involved in facilitating the trade of rice and other grains from the lowlands with salt from the highlands(Interview 5/2/2019). Early writings on the role of the Kathmandu Valley as a hub for trade and commerce can be found not only in Lichchhavi texts, but also in the writings of Xuanzang, a Chinese-origin scholar and monk who published memoirs about his travels in what is now Nepal and India more than 1300 years ago (Pradhan 1990). As in much of lowland South Asia, a widespread belief developed among the ruling elite of the Kathmandu Valley that people belonging to less prestigious occupational groups carried the potential to contaminate or pollute the water supply enjoyed by local elites and those of higher social status (Interview 5/2/2019; Pradhan

1990). For this reason, some but not all *hiti* were reserved for the use of denizens of higher social status, though the particulars of the restrictions of access were fluid, evolving gradually over the generations (Interview 5/2/2019; Interview 5/6/2019). Exactly how these beliefs evolved over time in the Kathmandu Valley remains patchy at best; while the earlier Lichchhavi period produced numerous written records, there are significant gaps in understanding the history of social relations in the Kathmandu Valley between the Lichchhavi period and the much later Malla dynasty (Interview 5/2/2019; Pradhan 1990).

Newari oral histories and artwork trace the modern name ‘Kathmandu’<sup>4</sup> to settlements and a wooden temple that was established by King Gunakama Deva in the late 900s – *Kasthamandap* literally means ‘wooden temple’ in the language of the medieval ruling elite of the day, and Kathmandu’s namesake temple remained standing until it collapsed in the 2015 earthquake (Interview 5/6/2019)<sup>5</sup>. The modern urban core of Kathmandu city was first densely settled during this period, with hubs of the earlier Kirat and Lichchhavi settlements located in the nearby modern wards of Thankot, and of Patan (Lalitpur) respectively (Neupane 2015; Pradhan 1990). While this narrative of the building of what is now Kathmandu Metropolitan City is well known locally, limited written records have survived from the reign of Gunakama Deva. What have survived, however, are newer *hiti* and other water infrastructure dating from this

---

4 In ancient times, native inhabitants referred to the Kathmandu Valley as ‘Yen’ and the older settlement of Patan - where *Manga Hiti* is located – as ‘Yala’.

5 I also personally visited the namesake *Kasthamandap* during earlier visits to Nepal in 2010 and 2012 before the Gorkha earthquake and before this research first commenced in 2017.

period, several of which are still in operation today (A more detailed analysis of the daily practices and water micropolitics of users of these *hiti* can be found in the following chapter). Like the older Lichchhavi-era *hiti* community spouts in the neighborhoods surrounding the historic *Kasthamandap* feature much of the same religious imagery and architectural design features, suggesting elements of continuity between these settlements and the older Lichchhavi era ones on the opposite side of the Bagmati River. For instance, the *makara*, the mythological creature with the river/deity *Ganga* also features prominently on the spouts of *hiti* near the historic *Kasthamandap*. Likewise, the upward sloping design of the spout itself, designed to maximize physical distance between the head of the spout and water collectors also features prominently on the spouts of this neighborhood suggesting that the social categories of *pani chalne* and *pani na chalne* were well-established by this period, yet had not reached levels found in the 19<sup>th</sup> and early 20<sup>th</sup> centuries when social segregation based on these categories was more thoroughly entrenched through complete separation of social status groups (Neupane 2015; Tiwari 2016).

#### *Social relations, Inequalities and Water Infrastructure Restrictions: A brief history*

Historical records of social relations in the Kathmandu Valley become more numerous from the Malla period onward, with few gaps in the written historical record from the end of the 12<sup>th</sup> century through the present (Interview 5/2/2019; Interview 5/6/2019). Many inscriptions from the early Malla period re-enforce and



provide more detail about longstanding social practices and customs that were first recorded, albeit in more limited form, during the earlier Lichchhavi period, which ran roughly from the 2<sup>nd</sup> through the end of the 8<sup>th</sup> centuries in the Gregorian calendar (Ibid). The early Malla of the Kathmandu were a group of Maithili-speaking<sup>6</sup> monarchs and nobles who fled their ancestral fiefdoms during the conquest of the Indo-Gangetic plains by the Turko-Afghan *khaljis*, the first Islamic leaders to rule over what is now northern India (Puri and Das 2003). Some of the Malla aristocracy brought slaves and servants with them as they fled northward, adding additional layers of social stratification to an urbanized valley already characterized by a complex division of labor (Interview 5/6/2019; Puri and Das 2003).

While the precise origins of the institution of slavery in the Kathmandu Valley remain unknown<sup>7</sup>, there are many indications that the practice became more widespread under early Malla rule (Interview 5/6/2019; Puri and Das 2003). The arrival of the Malla in Kathmandu also coincided with a period of increasing militarization of neighboring kingdoms, resulting from large-scale displacement of erstwhile monarchs and elites who would then try to establish political domination

---

6 The Maithili language is a Sanskrit-based Indo-Aryan language native to Bihar and Jharkhand states in modern India and to some adjacent Terai districts of modern Nepal. In the contemporary era, Maithili is the second most commonly spoken native tongue of Nepal, after Nepali or *Khas Kura*, but is not widely understood in Kathmandu, or other hilly regions of the country (Nepal census 2011).

7 Though the earliest verifiable records of slavery in the Kathmandu Valley date to the early Malla period, there is some circumstantial evidence to suggest that it was practiced in more limited form by the Lichchhavi, especially given water taboos associated with that era and the documented presence of slavery during the same time period in the Gangetic Plain (Interview 5/6/2019; Neupane 2015). While a consensus view is that slavery was not practiced by the ancient Kirat, details of when and how it began to be practiced in the Kathmandu Valley remain unknown (Ibid).

over their newly adopted homes (Singh 2010). The Kathmandu Valley was not the only place that Malla elites sought to settle and establish control; Malla rulers first migrated to what were then separate fiefdoms further west in Nepal where they began to exercise political power before expanding across a larger area (Ibid). For this reason, the political map of what is now northern India and the Terai plains region of Nepal was in a rapid state of flux with boundaries and political leadership actively contested during this epoch (Puri and Das 2003; Singh 2010). This ultimately had a spill-over effect into the Kathmandu Valley itself with an increase in training for soldiers and warriors during the early Malla period. Both the proliferation of soldiers and armed fighters and the expansion of slavery during this period would play a profound role in transforming the social relations of the Valley during the early Malla period.

While social restrictions on accessing urban infrastructure date back at least to the Lichchhavi period, such restrictions became more strongly codified and documented during this period. Nonetheless, historical antecedents to the accelerating social stratification of the early Malla period in the Kathmandu Valley can be inferred from elements of the architectural and aesthetic design of urban infrastructure like the *hiti* (Neupane 2015; Tiwari 2016). While restrictions on accessing urban water infrastructure included several rules to ensure hygiene and cleanliness, many of these rules were conflated with metaphysical notions of purity and pollution wherein members of marginalized status groups were viewed as less clean, and thus

potentially polluting, than those of higher status (Interview 4/25/2019; Neupane 2015; Tiwari 2016). More mundane guidelines included rules stipulating that laundry, dishes and cooking utensils be washed a certain distance away from the flowing taps themselves, and that all water collectors approach the *hiti* while barefoot and after cleaning their feet (Interview 4/25/2019; Neupane 2015). Traders and merchants returning from certain locations, especially those coming from the Tibetan plateau to the north, were sometimes required to complete a 15-day quarantine before mingling with the general population during which time they were banned from drawing or consuming water from *hiti* used by the public (Tuladhar 2020).

Though some of the guidelines for accessing the *hiti* ostensibly were motivated by concerns about hygiene and health, these concerns were often inseparable from philosophical beliefs about purity that were inextricably linked to understandings of social hierarchies and stratification. For instance, returning Newari traders were required to undergo quarantine when returning from locations whose inhabitants did not share similar spiritual beliefs, but were not required to undergo such quarantine when returning from locales where religious practices were more similar (Tuladhar 2020). This practice, known as *nee chwanegu* in the Newari language, began during the Malla dynasty at a time when trade between Kathmandu and Tibet reached a zenith. After completing the quarantine, returning traders were required to meet with monks and a priest, undergo a purification ritual and “obtain a piece of paper saying they had ‘got their caste back’, which they had supposedly lost during their journey”

(Tuladhar 2020: 8)<sup>8</sup>. Though the practice of *nee chwanegu* has disappeared entirely from contemporary Nepal, along with many other traditional practices of social exclusion from urban water infrastructure, other inequalities remain. Many of the social restrictions that have governed access to the *hiti* over the centuries have been abolished or relaxed during Nepal's transition to democracy in the contemporary era. Nonetheless, a number of the rules and regulations that were first documented in the Malla era, and alluded to during even earlier epochs of Nepal's history, reflect longstanding patterns of social stratification that cast a long shadow well into the present day.

One of the more enduring sets of social restrictions governing access to the *hiti* and other water infrastructure reflects inequalities mapped onto the body through unequal access to urban spaces (Nightingale 2012; Truelove 2011). For several centuries, menstruating and, at times, post-partum women were often required either to use physically separate taps from the general population, or were banned from the *hiti* entirely and required to collect water from downstream portions of rivers and streams (Interview 4/25/2019; Neupane 2015). Though in-depth questioning and analysis of such exclusions and inequalities remains outside the scope of this particular project, a number of scholarly works, including those published by feminist political ecologists (Nightingale 2012; Truelove 2011), have highlighted the enduring role social taboos

---

8 A more concise description of the practice of *nee chwanegu*, including the quotation cited above, can also be found in an Op-Ed piece published by the same author in the *Kathmandu Post* on August 30, 2020: <https://kathmandupost.com/columns/2020/08/30/self-quarantine-kathmandu-style> . (accessed 8/31/2020 AND 3/8/2021).

around menstruation play in women's access to water infrastructure in Nepal, and elsewhere in urban South Asia. To address such inequalities, the Government of Nepal has taken some steps in recent years to move toward greater protection of women's health and well-being through such measures as its recent anti-*Chhaupadi* campaign, which has sought to end the practice of women sleeping outside or in animal stables during menstruation (Adhikari 2020; UN Women 2017). Though the Government of Nepal formally passed legislation to abolish this practice in 2005, criminal penalties were added in 2018 for those who coerce members of their household to remain outdoors during menstruation, in response to a number of highly-publicized deaths of women by snakebite who were sleeping outdoors during their period (Adhikari 2020; Kathmandu Post 01/04/2021). While such practices have become less common in major urban areas of Nepal, and among younger women, a broad consensus of feminist scholars and practitioners agree that much more work needs to be done to address longstanding inequalities rooted in exclusions around menstruation (Adhikari 2020; Nightingale 2012; Truelove 2011; UN Women 2017). Subsequent studies conducted by Nepalese and South Asian women are needed to gauge the long-term success of such initiatives and identify areas for improvement in implementing policies to give women more agency to make choices over their bodies.

Restrictions on access to urban infrastructure rooted in differences in biological sex have proven to be some of the least fluid and most enduring forms of exclusion across the Kathmandu Valley over the centuries. This is in spite of the fact that the collection

of household water is a task most often left to women – a phenomenon that has changed little since depictions of household life found in literature and artwork dating back to the beginning of the Malla period, and likely even earlier (Interview 4/30/2019; Neupane 2015). Indeed inscriptions from antiquity suggest that the segregation of menstruating women from public amenities and urban spaces had its historical antecedents in the societies of the ancestral progenitors of the ancient Lichchhavi who had once inhabited the Gangetic plains to the south before being driven out by an earlier wave of invaders (Kaur 2019; Tiwari 2016). Such forms of segregation were not unique to the Kathmandu Valley, with examples of similar forms of exclusions documented across many historical kingdoms to the south and west over the centuries (Puri and Das 2003). Though such restrictions no longer carry legally-binding sanctions in the present day, social stigma over *jutho*, or contamination, persists re-enforcing longstanding patterns of segregation of women from the community, including in accessing *hiti* and other water taps, both in public spaces and within households (Adhikari 2020; Kaur 2019; Kathmandu Post 5/27/2019).

Restrictions on access to the *hiti* and other urban infrastructure rooted in social status have proven to be more fluid over the centuries than those rooted in sex. Nonetheless, the increasingly complex degree of occupational specialization that occurred as the Kathmandu Valley grew, coupled with a proliferation of slaves and servants brought and trapped by the Malla rulers (and likely by earlier political leaders), resulted in the

social segregation of urban space and access to public infrastructure (Interview 4/30/2019; Neupane 2015). Although the *hiti* themselves were designed to maximize physical distancing between water collectors and the stone taps, which was believed to be sufficient to avoid contamination during the earlier Lichchhavi period, the level of social segregation within urban spaces increased during the Malla dynasty concomitant with continued population growth and an increasingly complex division of labor (Interview 4/30/2019). Newer neighborhoods that developed during this period were often named for the dominant occupational group that inhabited them with facilities for washing and collecting water often segregated based on occupational prestige. For instance, the neighborhood of *dhobi chaur*, loosely translated as washer's square was built to segregate slaves and servants who did the laundry for wealthier residents from the taps where the wealthier residents themselves bathed (Interview 5/2/2019). Though many formal rules on access to the Kathmandu Valley's taps and laws on residential segregation are long gone, remnants of these practices endure. Today *dhobi chaur* continues to serve as a public space for domestic workers and hotel cleaning staff to wash and hang laundry without interfering in their employer's affairs and private space (Participant-observation 2017-18). A more detailed analysis on present-day practices and inequalities surrounding access to water infrastructure can be found in the following chapter.

While the Malla period witnessed growing social complexities, stratification and a burgeoning of trade between the Gangetic Plains to the south and Tibetan Plateau to

the north, the fundamental urban water technologies from this period remained strikingly similar to those found in earlier dynasties. The number of *hiti* and holding ponds that fed them, however, continued to increase throughout this period, which also witnessed the emergence of three distinct political jurisdictions within the Kathmandu Valley, each with its own ruling monarch (Interview 5/2/2019; Puri and Das 2003; Neupane 2015). While the early Malla period was characterized by political instability and increasing militarization, the political boundaries within the Kathmandu Valley began to stabilize over multiple successive generations of Malla rule, resulting in the discrete kingdoms of Kathmandu, Patan and Bhaktapur. The monarchs of each of these kingdoms had descended from common ancestral lineage, and inter-marriage between the clans was commonly practiced in order to assuage political rivals and ensure continued Malla domination over other social groups (Interview 5/2/2019; Neupane 2015). Malla royals and their families continued to build new *hiti* to meet the needs of a growing population, curry favor among their subjects and satisfy the metaphysical goals of ensuring spiritual benefits for their descendants (Ibid). The tribute that these royals extracted from the burgeoning trade between Tibet and what is now India gave their kingdoms unparalleled material wealth among the Himalaya hill fiefdoms of the day, leading to what many local texts refer to as a ‘golden age’ of Nepal Mandala, as the three kingdoms were known to outsiders (Neupane 2015; Puri and Das 2003; Singh 2010).



In addition to the construction of additional *hiti*, the later Malla period, or three kingdom period, also saw an expansion of the role of the *guthi* as a social institution, which played a crucial role in maintaining the *hiti* and other urban infrastructure (Interview 4/30/2019; Neupane 2015). It was during this period that the area of land managed by the *guthi* reached its peak. Most of this land was used for agricultural production, and surplus production from this land went to feed not only marginalized denizens and members of religious orders, but also provided sustenance to those who maintained the *hiti* and other urban infrastructure, in what was effectively a trade of surplus food for labor (4/30/2019). Competition between the Malla elite themselves likely also played a role in the expansion of urban infrastructure and social institutions to maintain such urban amenities, as did fears of insurrection from within the ruling families themselves (4/30/2019). These more worldly and materialistic impulses were often conflated with cosmological and metaphysical imperatives in the popular imagination, more closely approximating what Boelens (2014) describes as a hydro-cosmological discursive framing as a justification for the exercise of temporal power. Nonetheless, the *guthi* as a social institution played a moderating effect in the unequal power relations of the day, providing sustenance and access to land for those otherwise marginalized in an increasingly stratified social order (Interview 4/30/2019; Neupane 2015).

The increasing social stratification of the later Malla period of three kingdoms was accompanied by profound political changes in adjacent areas immediately to the

south and west, which indirectly influenced social and infrastructure policies in the Kathmandu Valley. Although the Indo-Gangetic plains to the south had first come under the rule of the Turko-Afghan *khaljis* centuries earlier, driving the initial Malla migration northward, by the early 16<sup>th</sup> century many smaller principalities and fiefdoms were consolidated into the much larger, more powerful Mughal Empire (Dasgupta 2005; Puri and Das 2003). In response to the consolidation of Islamic rule under the Mughal Dynasty, a number of smaller Hindu princes and lesser nobles fled to the hills to the north, as had been the case centuries earlier when the *khaljis* first ruled over portions of the Indo-Gangetic plains (Dasgupta 2005). Unlike in earlier eras, however, members of the aristocracy who were fleeing the Mughals brought with them Mughal military technologies, including firearms and heavy artillery, marking the first time that gunpowder-based technologies were adopted in the Kathmandu Valley and the Middle Hills of what is now Nepal, ultimately sowing the seeds for more substantive changes further down the horizon (Dasgupta 2005; Singh 2010).

The introduction of these new weapons sparked few substantive changes in the short- or midterm for the ruling Malla elite, as most of the fleeing aristocracy sought refuge to the west of the Kathmandu Valley, and those who did settle there made alliances with the Malla rulers, drawing on shared religious and similar linguistic and cultural identities (Singh 2010). Although the initial wave of settlement of Indo-Aryan aristocrats in the Middle Hills during the 16<sup>th</sup> century would help Malla rule endure

for two more centuries, the large-scale introduction of firearms to the neighboring hilly areas to the west would profoundly alter the history of the Kathmandu Valley in two major ways: first, it would ultimately lead the collapse of Malla rule through the *Gorkhali* conquest and unification of Nepal; second, it would help create the enabling conditions for a unified Nepal to resist and prevent British colonization during the period of European colonialism elsewhere in South Asia (Dasgupta 2005; Interview 5/2/2019; Interview 5/6/2019; Neupane 2015; Singh 2010).

*Social transformations, infrastructure and the end of Malla Rule: Transitions toward a unified Nepal*

During the final generations of the three kingdoms of Nepal Mandala the trend of enhanced trade and further specialization of the division of labor continued within the three kingdoms of the Kathmandu Valley. Though the relative proximity to the larger Mughal Empire was reflected in the dress of the Malla kings during this period and in the adoption of Persian terminology for bureaucratic and administrative staff, ancient Kirat water technologies continued to form the basis for the architectural design of new *hiti* and *lakhamaka* (reservoirs), even as the Mughal rulers embarked on their own ambitious infrastructure projects in the territories immediately to the south (Interview 5/6/2019; Neupane 2015; Singh 2010). Despite this, social practices in the three kingdoms of Nepal Mandala more closely resembled the highly stratified, class-segregated, slave-holding territories to the south and west rather than the more

communal and somewhat egalitarian societies of the ancient Kirat from whence the Kathmandu Valley's water technologies originated.

In spite of the profound social transformations and stratification that had occurred in the Kathmandu Valley since the Kirat of antiquity built the first water infrastructure, Kirati communitarianism existed concomitantly with Nepal Mandala in smaller settlements in the adjacent hilly regions immediately to the east (Interview 5/6/2019). Smaller Kirati towns and villages dotted the historic region of *Limbuwan* in what is now eastern Nepal, and as in the Kathmandu Valley, the water needs of these towns were met using a system of *lakhamaka* and *hiti*, albeit on a much smaller scale than those found in the urban Kathmandu Valley (Interview 5/6/2019; Khanal 2019). Although the social practices between these two sets of settlements had diverged radically since the construction of the Kathmandu Valley's earliest *lakhamaka* during antiquity, the underlying technology in both remained the same. This is due largely to the advantages of the ancient Kirati technology in hilly terrain over newer technologies of the plains' societies with which the Malla kings shared cultural affinities, religious practices and the institution of slavery (Interview 5/6/2019; Neupane 2015; Tiwari 2016).

Although urban water infrastructure in the Kathmandu Valley had long been maintained through the ancient *guthi*, or social trusts, rapid urban development during the later Malla era had begun to place additional stress on the *hiti*, some of which

were already more than 1000 years old by this point. Maintaining such ancient infrastructure increasingly occupied a prominent place in the priorities of the ruling elite of this period, especially given that the Malla kings were inclined to compete with one another in the construction of architecture and infrastructure often with the putative goal of building the most marvelous (i.e. ostentatious) structures possible (Interview 5/6/2019; Singh 2010). For instance, the rulers of all three Malla kingdoms (Kathmandu, Patan, Bhaktapur) expended enormous sums of capital and labor trying to outdo each other by building ever-larger temples and palaces around each respective city's *durbar* (royal) square. This competition also extended not only to the construction of new *hiti* and other related water infrastructure, but also sometimes to the renovation and upgrading of old infrastructure, much of which dated back to the Lichchhavi era.

When it came to urban water infrastructure, Bhaktapur became the first of the three to pass a law during the 17<sup>th</sup> century that regulated the maintenance of the *hiti* and the cleaning of reservoirs and canals, mandating roles for individual citizens to follow in maintaining the urban infrastructure (Neupane 2015; Singh 2010). These regulations did not replace the central role of the *guthi* in maintaining the *hiti*, but rather added additional responsibilities for other citizens to follow, including designated days when all residents were expected to perform maintenance work or, otherwise, face sanctions (Interview 5/2/2019; Singh 2010). Some of these expectations have endured into the present day in Bhaktapur District of contemporary Nepal – a district that continues to

place a strong emphasis on self-reliance and citizens' participation in the maintenance and preservation of historic infrastructure (Interview 5/6/2019). In Kathmandu and Patan, similar maintenance was performed once a year on the occasion of *Sithi Nakha*, although participation was never legally-binding as it once had been in Bhaktapur.

While competition between the three Malla kingdoms of the Kathmandu Valley of Nepal Mandala produced ornate architecture and infrastructure, drawing on the wealth of a major trade route, the infighting between the three Malla rulers also left them vulnerable to outside influence at a time when larger empires were consolidating to the south, north and west. Initially, the Malla aristocracy's primary concern was the powerful Mughal Empire, which existed to the south for the last two and half centuries of Malla rule (Dasgupta 2005; Puri and Das 2003; Singh 2010). By the start of the 18<sup>th</sup> century, however, turmoil between smaller principalities to the north in Tibet led to intervention by the emergent Qing Dynasty, which would ultimately result in the installation of an 'unofficial' Sixth Dalai Lama<sup>9</sup> in Lhasa with

---

9 The Sixth Dalai Lama is the only such leader of Tibet whose identity was contested historically. After the Fifth Dalai Lama died in 1682, his death was kept a secret for many years to project continuity during a time of instability and in-fighting among Tibetan principalities. Eventually, Tsgangyang Gyatso assumed the role of Sixth Dalai Lama, but had a reputation as a playboy and is believed to have been murdered while en route to Beijing to meet with Qing Dynasty officials. This led to Yeshe Gyatso – a prince of one of the then warring tribes of the Tibetan Plateau – to be declared the true Sixth Dalai Lama with the backing of Qing Dynasty officials. Yeshe is the only person to have been named Dalai Lama to have never been recognized by a majority of Buddhist clergy. He was eventually deposed to China where he died. After Yeshe's purported re-incarnation died of smallpox before being installed in Lhasa, the various Tibetan tribes ultimately agreed on the identity of a Seventh Dalai Lama, healing the rift of the contested identity of the Sixth Dalai Lama (Savada 2002; Tsepon and Shakpa 2010).

the backing of the Qing Emperor (Savada 2002). At the same time, the Qing Dynasty also stationed military governors, known as *Amban*, in Lhasa to monitor local events and serve as liaisons between the Qing Emperor and the court of the Dalai Lama (Tsepon and Shakpba 2010). In response, representatives of all three Malla kings send greetings and gifts to the Qing Emperor vis-a-vis the *Amban* stationed in Lhasa, leading to a perception within the Beijing-based court that Nepal Mandala was also an outlying tributary kingdom – a perception that was never shared among the Malla and that remains strongly rejected within Nepal in the present day (Interview 5/2/2019; Interview 5/6/2019; Savada 2002; Singh 2010; Tsepon and Shakpba 2010). A more detailed analysis of China and perceptions of great power politics on water infrastructure development in the present-day can be found in the final chapter of this work.

While the Malla kings would occasionally pause their internal rivalries and one-upmanship with one another to attend to geopolitical developments among the larger powers to their north and south, it was ultimately the rulers to west who would bring about the downfall of the Malla dynasty of the Kathmandu Valley. Throughout the 17<sup>th</sup> and 18<sup>th</sup> centuries the Kingdom of Gorkha, located in the Middle Hills immediately to the west of the Kathmandu Valley, began to expand and grow in power. The Kingdom of Gorkha was composed of a multi-ethnic population whose historical evolution shared several similar features to that found in the Malla-era Nepal Mandala of the Kathmandu Valley (Acharya and Naraharinath 2014). The

Gorkhali kings, like the Malla rulers, had also descended from Indo-Aryan lesser aristocrats who had once fled what is now northern India during several successive waves of invasion by conquerors from the west. Stratification within Gorkhali society of the 18<sup>th</sup> century was also broadly similar to that found in Kathmandu in the sense that its upper echelons were ruled by aristocrats of Sanskrit-speaking ancestral origins who had fled to the hills with numerous servants and slaves, the latter of which formed the basis of what would become an enduring underclass (Adhikari 2014; Interview 5/6/2019; Paudel 2016). These speakers of the Indo-Aryan languages, both elites and the enslaved alike, arrived in a region that had already long been populated by speakers of Sino-Tibetan languages – in this case the Magar and the Gurung were the two largest such ethno-linguistic groups, while the more distantly related Kirat's ancestral lands lay further to the east (Pradhan 1991).

While the earliest Indo-Aryan kings of Gorkha had engaged in conflict with leaders of the indigenous Magar and Gurung peoples, by the 18<sup>th</sup> century a more unified *Gorkhali* identity had been forged through the creation of a multi-ethnic coalition of soldiers who were successful at conquering land from small neighboring kingdoms (Acharya and Naraharinath 2014). The families of Gorkhali soldiers who were successful in battle were often rewarded with royal land grants in the newly conquered territories, prompting more and more young men to join the coalition headed by the Gorkha king (Pradhan 1991). At the time Prithvi Narayan Shah ascended the throne of Gorkha in 1743 there existed 54 separate fiefdoms, comprising



what is now the present-day territory of the Federal Republic of Nepal (Acharya and Naraharinath 2014). While the new king's dream was to forge a single strong state, the primary focus was on bringing the three Malla kingdoms of the Kathmandu Valley under Gorkhali rule, given that these three kingdoms were exceptionally wealthy, owing to their position on the primary trade route between Mughal India and Tibet (Interview 5/6/2019; Pradhan 1991).

Conquering the populous and wealthy Malla kingdoms of Nepal Mandala outright would prove to be a monumental task, so the Gorkhali armies devised an initial strategy to cut-off the Malla kings' most lucrative trade routes by first conquering the narrow corridors traversing the Mahabharata Range that connected the Kathmandu Valley to lowland Mughal India (Acharya and Naraharinath 2014). The rationale behind this strategy was that creating an economic crisis would be the best way to deprive the Malla aristocrats of the means to launch a robust defensive effort, and that once the prosperous Kathmandu Valley had been brought under Gorkhali control, extending Gorkhali rule to other small neighboring principalities would be made much easier (Pradhan 1991). Nonetheless, Prithvi Narayan Shah's initial attempts at accomplishing these goals were unsuccessful and may well have remained so, had it not been for the Malla rulers' own penchant for spending most of their wealth out-competing each other by building the most lavish and opulent palaces and temples possible (Dasgupta 2005; Pradhan 1991). Finally, after more than two decades and multiple failed attempts to bring the Kathmandu Valley under Gorkhali control, the

armies of Prithvi Narayan Shah got a toe-hold in the valley, setting up an outpost and fort in Kirtipur, adjacent to the Malla kingdom of Patan. From there, full control of the Valley and the surrender of the Malla rulers came just a few years later in 1767 (Acharya and Naraharinath 2014).

*Stratification in Unified Nepal, European Colonialism and the Codification of Water Inequalities*

Once Prithvi Narayan Shah defeated the Malla kings of the Kathmandu Valley after decades of efforts to bring the valley under Gorkhali control, the unification of modern Nepal followed within a matter of just two years (Acharya and Naraharinath 2014; Pradhan 1991). Yet, despite the epochal shift described in history books, and the hailing of Prithvi Narayan Shah as a hero of the Nepali nation in the present day, many of the underlying social dynamics, stratification and inequalities that characterized Malla-era Nepal Mandala persisted in the newly unified state (Adhikari 2014; Interview 5/9/2019; Paudel 2016). Moreover, the scope and scale of the arrival of new settlers from the erstwhile Kingdom of Gorkha remained quite limited, save for the Shah royal family itself, which quickly settled into the opulent palaces built by the previous Malla aristocrats. Many warriors who had served with the Gorkhali king had been granted tracts of land in other areas of the newly unified Kingdom of Nepal where undeveloped and uncultivated land remained more abundant (Acharya and Naraharinath 2014). The old Malla elites did not disappear from the Kathmandu

Valley entirely, but rather continued to occupy prominent roles acquiring wealth along the lucrative India-Tibet trade route, albeit without the absolute political power that their forebears had enjoyed (Pradhan 1991). The Newari language, a Sino-Tibetan tongue derived from ancient proto-Kirat and influenced by Sanskrit and Persian vocabulary, remained the local vernacular and the *guthi* continued to play a prominent role as a social institution, providing services that the political leaders themselves did not (Neupane 2015).

One of the most significant challenges to the newly unified Kingdom of Nepal and to the policy priorities of the Shah Dynasty concerned developments external to Nepal's borders. By the time Prithvi Narayan Shah had set about his efforts to conquer and unify Nepal into a single kingdom in the 1740s, the British East India Company had already established close commercial ties with the *Nawabs* of Bengal, at that time one of the wealthiest and most prosperous kingdoms in South Asia (Acharya and Naraharinath 2014). In the years leading up to Nepalese unification, a young King Shah attempted to develop trade relationships with the kingdoms to the south and north. While these efforts were largely successful, the one exception was the East India Company in Bengal, which categorically refused to deal with the young Gorkhali king (Pradhan 1991). This refusal helped galvanize Gorkhali efforts not only to bring the Kathmandu Valley under Shah rule, but to unite all 54 principalities that would come to comprise modern Nepal (Interview 5/6/2019; Interview 5/9/2019). By the time the Malla dynasty had fallen to Shah in 1767, Shah and his closest advisers

had become convinced that broader unification was the only way to prevent military conquest by the East India Company, which at that time had already begun to exert broader political control over Bengal with the implicit backing of British crown (Acharya and Naraharinath 2014; Interview 5/6/2019). Shared concerns over the growing power of the East India Company also played a role in motivating Kirati elders to the east to make alliances with Prithvi Narayan Shah; the Kirat were granted significant autonomy over much of their ancestral lands in exchange for formal recognition of Shah as king and a shared commitment to provide for the mutual defense of the newly unified territory (Acharya and Naraharinath 2014; Interview 5/6/2019; Interview 5/9/2019).

One factor that had enhanced the Shah dynasty's suspicion of the East India Company was an ill-fated effort by one of the Malla monarchs of Patan to request British assistance to prevent Prithvi Narayan Shah and his army from conquering the Kathmandu Valley. The East India Company ultimately responded to the Malla kings' request by sending a force of 2500 soldiers overland from Bengal under the leadership of British Army Captain Kinloch (Bajracharya 2007). Kinloch's forces marched the nearly 1000 kilometers through swamps and into the hills during the summer monsoon season, ultimately approaching the Kathmandu Valley with a greatly diminished force, due to high rates of malaria and desertion (Bajracharya 2007). The Gorkhali forces had by this point already established a strong presence along the narrow mountain passes leading into the Kathmandu Valley from the south,

easily overpowering the British units that remained and ultimately marching into Kathmandu itself with the British Army's own weapons (Bajracharya 2007; Interview 5/6/2019). Although the Malla kings' armies also had access to firearms and artillery first brought to Kathmandu during the Mughal era, these weapons proved to be antiquated in comparison to the newer British firearms, helping greatly to expedite the Gorkhali conquest of the valley after more than two decades of failed attempts to do so. Given the heavy emphasis on military technology in general, and the East India Company in particular, the further development of urban amenities and technologies took a back-seat to military strategy and expenditures during the early years of the Shahs rule of unified Nepal.

While military and defense concerns preoccupied the policy agenda of the first Shah kings ruling over a unified Nepal, the Shah Dynasty was ultimately successful in preventing the fall of their kingdom to any foreign colonizers – an accomplishment that eluded most other monarchs in neighboring regions of the day. Political developments to the south and to the north placed some further constraints on the power of Prithvi Narayan Shah's sons and successors to the throne. Nonetheless, the Kathmandu Valley itself, along with the historical territory of the Kingdom of Gorkha from whence the Shah Dynasty first began ruling remained politically independent throughout the entire period of European colonialism (Acharya and Naraharinath 2014; Bajracharya 2007; Interview 5/6/2019; Interview 5/9/2019; Neupane 2015). Although Prithvi Narayan Shah had projected his power far beyond Kathmandu, and

well into the Tibetan Plateau, his aggressive posturing in the region prompted the Qing emperor in Beijing to send in a massive military response to re-affirm Tibet's status as a Chinese tribute state (Acharya 2013; Interview 5/9/2019). This would eventually lead to the expulsion of Shah Dynasty forces from Tibet and prompt a demand for Pratihvi Narayan's son – by then already king – to pay tribute to Beijing (Acharya 2013). Such payments, although limited in value, would occur five times over the following 75 years (Ibid). This also had the ultimate effect of limiting trade between the Kathmandu Valley and Tibet in the years that immediately followed, due to the heavy militarization by the Qing Army of the mountain passes that connected the Kathmandu Valley to the Tibetan Plateau. Though such trade eventually resumed in the decades that followed, concerns about the militarization of these mountain passes and China's own perceptions of its historical relationship with Nepal linger in the present day.

### *The Rise of British India and its Impacts on Nepal*

Another more pressing concern for the Shah kings was the growing power of the British East India Company, which had thitherto never formally recognized Nepal as a politically independent kingdom. During the initial decades after the unification of Nepal, the swampy, often water-logged, southern border had never been formally demarcated or surveyed, while British representatives refused requests to acknowledge Nepal's boundaries, as requested by the Shah kings (Acharya and

Naraharinath 2014). For their part, the Shah rulers refused to entertain multiple requests by the East India Company to open up a trade route through Nepalese territory, to allow passage by traders of the East India Company to engage in direct commerce between India and Tibet (Upadhyaya 2012). Fears of a British-backed invasion reached a culmination in 1814 with the start of the Anglo-Nepalese war when British forces began mobilizing soldiers along the then-undefined Indo-Nepalese border with four major divisions of troops, ranging from west to east (Upadhyaya 2012). While initial attempts by the British to use a more direct route into Nepal to enter Kathmandu proved to be unsuccessful – the Anglo soldiers stationed at Bara Gadhi directly south of the Kathmandu Valley never advanced into Nepalese territory at all – the British units found more success by making alliances with former leaders of the Garhwal Kingdom in the far west and the Kingdom of Sikkim in the far east, both of which had been conquered by Prithvi Narayan Shah less than five decades earlier in his unification of Nepal (Acharya 2013; Upadhyaya 2012).

Given the long distance between Garhwal in the west and Sikkim in the east from the Shah's Dynasty's center of power in the Kathmandu Valley and Gorkha, Nepalese soldiers in these peripheral regions were vastly outnumbered, especially after local elites began providing the British soldiers with additional support. After over a year of heavy losses on both sides the British forces, under the command of Major General David Ochterlony, began to draft terms for a peace agreement between the Shah Dynasty and the British forces (Upadhyaya 2012). The Shah soldiers had suffered the

heaviest losses along the periphery of what was then the Kingdom of Nepal, yet the British forces remained unable to advance into the central core of Nepal, with the Kathmandu Valley itself and the historical lands of Gorkha left largely untouched by the fighting (Pradhan 2012; Upadhyaya 2012). With both sides having faced heavy losses, and with the rainy season fast approaching on the swampy plains where thousands of British troops had already died of malaria and dysentery the previous year, the leaders of both armies faced pressure to ratify a treaty ending the conflict. Additionally, the British leaders saw the value of maintaining what they saw as a buffer state between their holdings in India and the powerful armies of the Qing Dynasty further to the north. Although an initial effort at a treaty by General Ochterlony was rejected by the Shah leaders, a second effort proved to be successful with the two sides signing the Treaty of Sugauli in March 1816, a document that would not only bring about an end to the fighting, but that would provide formal recognition for Nepal and shape the international relations between Nepal and other world powers into the present day (Pradhan 2012; Upadhyaya 2012).

Though the Treaty of Sugauli required Nepal to cede the peripheral territories of Sikkim and Garhwal to the control of British India, it also established legal recognition of the Kingdom of Nepal by the major European powers of the day, defining formal boundaries of an independent nation-state whose recognition would endure into the 21<sup>st</sup> century (Upadhyaya 2012). The legacy of the Treaty of Sugauli has played a central role in the political priorities of the Government of Nepal and the



social and cultural life of the Middle Hills throughout the past two centuries. Initially, the Treaty of Sugauli included a provision for the East India Company to lease some of the low-lying swamp lands of the Terai from the Shah Dynasty for a sum of 200,000 rupees/month, but these lands were soon returned to full Nepalese control after the British colonizers perceived them as difficult to govern and rife with malaria (Pradhan 2012). The boundaries of Nepal, defined by the Treaty of Sugauli as stretching from the Mahakali River in the west to the Mechi River in the east, remain the boundaries in the present day as recognized by the international community (Upadhyaya 2012). The recognition of these eastern and western boundaries by the European powers, and later by the international community more broadly, has remained unchanged since the Treaty of Sugauli was ratified in 1816.



*(Figure 1.8 depicts lands between the east and west branches of the upper Mahakali River that remain the source of an unresolved border dispute between Nepal and India, dating back to the Treaty of Sugauli of 1816, which provided British recognition of Nepal's sovereignty).*

Though the Treaty of Sugauli defined the boundaries of modern Nepal as the land between two rivers, how to apply this definition remains contested, both politically and culturally. The uppermost reaches of the glacial-fed Mahakali River has an east and a west branch – a fact that was likely unknown to the drafters of the original treaty. The discrepancy over which of these two upper branches constitutes Nepal’s external boundary is the source of an ongoing and unresolved boundary dispute with India, with Nepal claiming all lands east of the westernmost branch, and India claiming all lands west of the easternmost branch (Government of Nepal 2019; Interview 5/9/2019). This dispute has been exacerbated by water sharing treaties between Nepal and India over the waters of the Mahakali that are widely perceived as unequal within present-day Nepal (Butler 2016; Interview 5/9/2019; Interview 5/14/2019). Moreover, the hilly regions immediately to the east of Nepal’s eastern boundary on the Mechi River have seen a robust *Gorkhaland* movement in recent years, with local activists demanding greater autonomy from lowland governments in Kolkata and Delhi, highlighting the shared language and culture between themselves and the Gorkhali peoples of Nepal. In particular, participants in this movement have called for the formation of a new federal state within India out of the districts of Darjeeling and Kalimpong in West Bengal where Nepali speakers constitute the primary share of the population (Besky 2017). This would allow residents of these districts to receive education and government services in the Nepali language rather than Bengali (official language of West Bengal state where these districts are located) or Hindi.

Many of the other provisions of the Treaty of Sugauli have continued to play a key role in shaping Nepalese politics and social relations from the 19<sup>th</sup> century into the present day. One significant enduring legacy of the Anglo-Nepalese War was the establishment of the Gurkha Battalion of the British Army. Impressed with the skills of the Gorkhali soldiers during the war, British forces serving in India soon began hiring Nepalese soldiers of the Shah Dynasty to serve across the British Empire in exchange for payment in pounds sterling (Pradhan 2012; Upadhya 2012). In the years immediately following the Anglo-Nepalese War, the Gurkha Battalion played an instrumental role in buttressing British colonial power, often re-enforcing colonial administrators in places where UK-born Anglo soldiers themselves were stretched thin. More recently, British Army Gurkhas served in both world wars of the early 20<sup>th</sup> century, including performing front-line roles during the D-Day invasion of Normandy in World War II. After decolonization of the former British Empire, multiple Gurkha Battalions have remained in the Indian Army, the Singapore Army, as well as the British Army, providing a critical source of employment and income for many communities in the Middle Hills of Nepal in the present day. High profile examples of roles of Gurkha Battalions in the 21<sup>st</sup> century have included providing security detail for the UK's Prince Harry when he was serving as a fighter pilot in Afghanistan and providing front-line security at the Singapore summit held between US President Donald Trump and North Korean leader Kim Jong Un in 2018 (Interview 5/14/2019; Kathmandu Post). With nearly 30% of Nepal's total GDP

comprised of foreign remittances in 2019, the Gurkha Battalions were the first major group of Nepalese laborers to send foreign currency earned abroad back to Nepal (Interview 5/14/2019; Interview 5/18/2019; World Bank 2020).

The prominent role that Gorkhali soldiers played in unifying Nepal and later preventing British conquest of the Kathmandu Valley would ultimately come to shape Nepal's power dynamics over the course of the 19<sup>th</sup> century. While Prithvi Narayan Shah was widely viewed as a powerful monarch, the early deaths of his successors led to much shorter reigns, with King Girvanuyuddha Bikram Shah only 18 years old at the time the Treaty of Sugauli was ratified (Upadhyaya 2012). This gave army leaders an out-sized role in shaping the terms and conditions of government policy – a trend that would continue in the decades immediately following the Anglo-Nepalese war (Interview 5/14/2019). Most official documents and policy proclamations in the years immediately following the conclusion of the Anglo-Nepalese War were indeed focused on defense policy rather than provisions for infrastructure spending or ornate architecture, as had often been the case during the earlier Malla period (Interview 5/14/2019). With the powerful armies of the Qing Dynasty immediately to the north and the consolidation of power of British India to the south, the influence of military leaders continued to grow, especially after the early death of King Girvanuyuddha Bikram Shah led to the coronation of his son, Rajendra, who was only two years old at the time he assumed the throne (Pradhan 2012; Upadhyaya 2012).

The Kingdom of Nepal officially remained an absolute monarchy in the initial years after the ratification of the Treaty of Sugauli, despite the fact that top army officials were often more involved in running the state than the Shah rulers themselves were. That all changed in in the 1840s when Jang Bahadur Rana, a grandson of the top military general for former King Prithvi Narayan Shah, assumed the role of first Prime Minister of Nepal (Acharya 2012). Although King Rajendra Shah had reached adulthood by that point, he was widely perceived as being a relatively ineffective king with limited interest in the affairs of state (Acharya 2012; Interview 5/14/2019; Pradhan 2012). After orchestrating a series of massacres that killed many of King Rajendra's ministers and members of the royal court. Jang Bahadur Rana installed many of his own relatives in top positions as royal advisers, before conspiring to have King Rajendra deemed mentally incompetent to continue performing his royal duties eventually forcing Rajendra's abdication (Acharya 2012). Although Rajendra's eldest son Surendra was ultimately crowned as the new monarch, the new King Surendra would effectively serve as a ceremonial figurehead, while the real political power of the Nepalese state was eventually vested in the newly minted Prime Minister Jang Bahadur Rana – a role that would also become hereditary over the century that followed (Acharya 2012; Pradhan 2012). This marked the beginning of what is most commonly referred to as the Rana Dynasty. Even though the Shahs continued to hold the ceremonial title of monarch, it was the hereditary Rana prime ministers who held near-absolute political power in Nepal for more than a century thereafter (Acharya 2012).

One of Jang Bahadur Rana's central policy preoccupations after being named first Prime Minister of Nepal in 1847 was to achieve full diplomatic relations with all the European colonial powers of the day in addition to the previously established relationship with the UK. This would ultimately lead to a formal and rigid codification of longstanding social inequalities in Nepal that had previously been more fluid and informally defined, While the Treaty of Sugauli was the first formal legal framework that provided recognition of the independent Kingdom of Nepal by any of the European colonial powers, British dominance in India had increased significantly in the 30 years since it had been ratified, and there was no official recognition of Jang Bahadur Rana's role as Prime Minister (Acharya 2012). For this reason, the newly minted prime minister's first goal was to woo the support of the major European powers in an effort to boost his own legitimacy and image on the global stage at a time when European colonialism was near its zenith (Acharya 2012; Interview 5/14/2019).

Jang Bahadur Rana became the first political leader of Nepal to travel far beyond its boundaries, heading to the United Kingdom and France after brief sojourns in British India, Sri Lanka (Ceylon) and Egypt (Bista 1991; Neupane 2019). While in the UK he met then Queen Victoria before heading to France where he lobbied unsuccessfully to establish formal diplomatic ties between the French state and his own government (Neupane 2019). Convinced that a large part of his failure to establish a bilateral

relationship with the French government was due to a lack of written laws, acts and covenants, Jang Bahadur Rana returned to Nepal where he focused his efforts on drafting written ordinances and codes, in what he viewed as the European tradition of the rule of law (Bista 1991; Interview 5/17/2019). The Napoleonic codes of France served as a major source of inspiration for what would become Nepal's first detailed national codes. One primary aim was to make legible the erstwhile Shah kings' claims that "Nepal is a garden of four *varnas* and 36 *jat*<sup>10</sup>" to an elite European audience by codifying existing social divisions based on occupational prestige, perceptions of purity and ethnic identity into a rigid, formal hierarchy that broadly aped the style of the French Napoleonic codes (Neupane 2019).

The *Muluki Ain*, or National Code, of 1854 was the byproduct of Jang Bahadur Rana's efforts to codify Nepal's existing ethnic groups, and longstanding patterns of social stratification, into a rigid hierarchical framework in an effort to gain diplomatic recognition and legitimacy in the eyes of European colonial elites. The *Muluki Ain* categorized all citizens into one of five hierarchically constructed categories, and

---

10 This quotation, originally attributed to Prithvi Narayan Shah, was an effort to describe the diversity of the Kingdom of Nepal shortly after its unification. Earlier English translations have used the word 'caste' for *varna* and 'sub-caste' for *jat*, even though these two terms have quite different meanings from one another. The Sanskrit-origin word *varna* is associated with four categories of occupations... traditionally associated with varying levels of purity in ancient Hindu thought. The word *jat*, however is better translated as 'nationality' or 'ethno-linguistic' group. For instance, the Newars of the Kathmandu Valley tend to strongly self-identify as a singular ethnic and linguistic group (*jat*), yet can belong to any of the four *varna* based on their occupational prestige. For the historically more communitarian Kirat, however, and for other indigenous nationalities of Nepal who were once outside the Hindu system altogether, one's *varna* and one's *jat* are typically viewed as one and the same. Moreover the *varna* of a particular *jat* have been known to vary from generation to generation, depending on changes in social status and material wealth.

prescribed differential levels of punishment for transgressions committed by, and against, citizens belonging to different social groups (Neupane 2019; Pradhan 2012). Crimes committed against someone of higher status carried harsher penalties than those committed against someone of lower status. Similarly, offenders of higher status were to receive lighter penalties than offenders of lower status (Neupane 2019). Moreover, many of the specific criteria for categorization into this hierarchy, along with many of the offenses named in the code itself, were directly centered on inequalities and exclusions around access to water and water infrastructure. Formal legal state recognition of these hierarchies lasted for over a century until its abolition in 1962, while more comprehensive anti-discrimination laws and system of affirmative action based on these categories was established in 2008 after the conclusion of a civil war (see chapter 3 for more details on the *Jana Yuddha*, or People's War). The table on the page below (Figure 1.9) provides an overview of the *Muluki Ain* of 1854, demonstrating how such water inequalities and exclusions were built into, and played a central role in the social hierarchies of the day. Though earlier architectural designs of public water infrastructure like the *hiti* indicate that practices of ritualistic water impurity existed well before the era of European colonialism, the 1854 code marked the first time that such hierarchies were codified into a rigid, fixed hierarchial framework that entrenched and exacerbated longstanding patterns of social stratification in Nepal.



Level of Hierarchy	Name of Category	Examples
<i>Water pure Groups</i>	<i>Pani Chalne Jat</i> (Water acceptable groups)	Note: Members of these groups could give/share water or food sources without concerns about ritual pollution
1	<i>Tagadhari</i> (Wearers of golden thread/twice born) access to inner sanctum of temples generally unrestricted	All <i>bahun</i> and <i>chhetri</i> → e.g. Upadhyay, Thakuri, Shrestha (Hindu Newar), Madhesi brahmans and kshatiya, Joshi, Rajput etc.
2	<i>Na Masine Maitwali</i> (non-enslaveable alcohol drinkers) → higher status indigenous nationalities, usually Sino-Tibetan linguistic background	Magar, Gurung, Kirat, Rai, Limbu Non-Hindu observant Newar, including Shrestha, Shakya, various Newar merchant classes
3	<i>Masine Maitwali</i> (enslaveable alcohol drinkers) → lower status indigenous, mostly Sino-Tibetan linguistic background	Tamang, Hyolmo, Sherpa, Chepang, Gyarti, Tibetan Tharu, Kumal (non Sino-Tibetan)
<i>Water impure Groups</i>	<i>Pani Na Chalne Jat</i> (Water unacceptable groups)	Note: Generally segregated from higher status groups, especially around access to water
4	<i>Pani Na Chalne Choi Chito Halnu Na Parne</i> (Water impure, but touchable)	Khadgi, Kapali, Tamrakar, Musulman (Muslim) Mlechha (European)
5	<i>Pani Na Chalne Choi Chito Halnu Parne</i> (Water impure, untouchable)	Dhobi, Kami, Sarki (Hill Dalits) Most historically would go by only one name (no surname)

The phrases ‘*choi chito halnu (na)parne*’ in the lower 4<sup>th</sup> and 5<sup>th</sup> categories listed above refer to the process of ablution, or ritualistic cleansing with water, in the event that someone of lower social status comes into close (forbidden) contact with someone of higher status. While people belonging to both of the lower categories were categorized as carrying the potential to ‘pollute’ water if certain physical distancing measures were not implemented (for instance, drawing water from a

common well), only social status groups from the lowest 5<sup>th</sup> tier were categorized as carrying the potential to ‘pollute’ any object, person or living animal that they touched (Interview 4/30/2019; Interview 5/14/2019). Moreover, there were some exceptions to these rules, involving items like raw fish, or uncooked meat, which were believed to be purified through the cooking process, and/or off-limits to some of the highest status groups anyways (Interview 5/14/2019; Mainali 2015). Many of the same water restrictions that were applied to citizens from these lower two tiers of the *Muluki Ain* of 1854 also applied to animals that were considered unclean such as dogs and pigs, but not to what were characterized as ‘clean’ animals such as cows and goats (Interview 5/14/2019; Mainali 2015). Though the ancient *hiti* of the Kathmandu Valley were officially considered to be ‘safe’ for all groups to use because the design of their conduits allowed for physical distancing, in practice, social stigma and practices of residential segregation prevented members of the lowest and highest status groups from using the same taps later in the Rana era (Interview 4/30/2019; Interview 5/14/2019).

Although Jang Bahadur Rana was influenced by French Napoleonic Code in the promulgation of the *Muluki Ain* of 1854, another major influence were concomitant British attempts to codify ancient Hindu beliefs to provide for the punishment of British colonial subjects in India (Interview 5/14/2019; Pradhan 2012). It is important to note, however, that while many such colonial-era codes were indeed rooted in interpretations of ancient Sanskrit texts and more recent social practices, efforts to

codify these ancient beliefs into rigid, written legally-binding acts were unique to the period of European colonial influence in South Asia. Prior to the consolidation of the British East India Company's control over the many smaller principalities that would become India, written legal codes were limited to the *Fatawa-e-Alamgiri*, which applied only to Muslims in the Mughal Empire and not to the majority of the population that was comprised of Hindus, Buddhists, Sikhs, Parsis and Jains (Olivelle 2005; Srikantan 2014). During the early days of the East India Company's ventures in South Asia, Europeans possessed very little knowledge about the local beliefs or social practices of the region and felt a strong need to construct written legal frameworks for their soon-to-be colonial subjects to maintain maximum political control with limited military resources (Olivelle 2005; Srikantan 2014). Inspired by existing written codes, such as the *Fatawa-e-Alamgiri*, that already applied to Muslims living in the region, representatives from the UK administration soon set out to construct a parallel set of acts and ordinances that would apply to the majority Hindu population (Olivelle 2005).

A major turning point in the colonial administration of British India came with the translation of the Sanskrit text *Manava-Dharmasastra* into the English language in the 18<sup>th</sup> century. Originally written roughly 2000 years ago, *Manava-Dharmasastra*, later referred to as Manusmriti in English, presents a series of discourses between two main characters, Manu and Bhrigu, on topics ranging from morals, duties, rights, laws and conduct, and was originally characterized as a Hindu version of the Bible or

Qu'ran by representatives of the British East India Company in the 18<sup>th</sup> century (Olivelle 2005; Srikanta 2014). Though later scholarly analysis would come to suggest that the version of *Manava-Dharmasastra* translated in the 18<sup>th</sup> century was likely a fake, and even though sacred scripts did not play the same role in ancient South Asia as they do in the more textually-oriented Abrahamic religions, the 18<sup>th</sup> century translation of *Manava-Dharmasastra*, or Manu's Laws, would come to form the basis for colonial-era laws in British India and strongly shape how Hindu beliefs were understood within the Anglo-American intellectual tradition (Olivelle 2005). Beyond incorrectly viewing the *Manava-Dharmasastra* as a Hindu bible of sorts, colonial administrators in British India failed to recognize the text as a social commentary on values and morality, instead viewing sections of it as a series of legal dictates roughly analogous to those found in the biblical ten commandments, or in the Islamic tradition of *sharia*. Moreover, the particular sections of the *Manava-Dharmasastra* viewed as laws and ordinances described distinctions between different *varna*, thus providing the textual basis for what would come to be translated into English as the 'caste system' (Olivelle 2005; Sewell and Debrett 1796).

Of particular relevance to the East India Company, and later to the *Muluki Ain* of 1854 in Nepal, was a section of the *Manava-Dharmasastra* on rules related to penance. This section immediately follows lengthy dialogues about the duties (*dharma*) of priests, kings, and other members of society, and discusses the need for proportionate punishment for transgressions, including self-reflexive penance in

addition to any sanctions imposed by temporal authorities (Sewell and Debrett 1796: 3.2:11.1→11.265; Srikanta 2014). The colonial administrators of British India came to interpret these verses as prescribing differential punishments for people of different social status groups. While the phenomenon of wealthier and more connected people receiving lesser punishments for the same offense than those of lower status has been a common feature of many societies throughout human history, the English translation of *Manava-Dharmasastra* led administrators in British India to codify into rigid hierarchies what was originally a social commentary on virtues and morality (Olivelle 2005; Srikanta 2014). By codifying what were previously complex and evolving inter-dependent traditional systems, these new laws effectively froze the status of women and socially marginalized groups, while reducing centuries of evolution and development of ethical, religious and social systems to fit their preconceived European notions of what religious law ought to be (An-Na'im 2010; Srikanta 2014).

Although the *Muluki Ain* of 1854 was drafted by Nepalese political elites of Hindu faith rather than by European colonial administrators, the primary goal was to establish legitimacy in the eyes of the European powers. One of Prime Minister Jang Bahadur Rana's chief goals during his European sojourn in 1850-51 was to expand diplomatic recognition of the Kingdom of Nepal to powers beyond the British crown, quite possibly due to concerns about the UK's ever-expanding colonial territories during the period that coincided with his rise to power (Mainali 2015; Neupane 2019;

Pradhan 2012). Moreover, the social categories constructed by the *Muluki Ain* of Nepal did not align with those found in the colonial laws of British India in several significant ways, even though the putative foundation for both sets of laws were the four Hindu *varna* as described in ancient Sanskrit texts (Mainali 2015; Neupane 2019). A number of Sanskrit manuscripts describe the four *varna* as *Brahmins*, *Kshatriyas*, *Vaishyas* and *Sudras* (priests, warriors and administrators, farmers and merchants, laborers and service providers) (Mainali 2015; Neupane 2019; Olivelle 2005; Srikanta 2014). The *Muluki Ain* of 1854 of Nepal, however, collapses the Sanskrit *Brahmins*, *Kshatriyas*, and even some *Vaishyas* into a single high-status category, while adding two additional levels of hierarchy for indigenous peoples of the hills (Mainali 2015; Neupane 2019). While some of these differences can be explained by the different demographic make-up of Nepal from British India, another key point is that Prime Minister Rana himself would not have belonged to the most elite category of the social hierarchy, as it was defined by colonial law in British India (Mainali 2015; Neupane 2019; Olivelle 2005; Srikanta 2014).

While many present-day authors and scholars in Nepal give the Rana rulers some credit for helping maintain Nepal's political independence during the European colonial period, the Ranas are also perceived as having ruled with an iron fist, deliberately preventing economic and social development to maintain their grip on power, and leading to massive disinvestment and neglect in public amenities like urban water infrastructure (Interview 5/14/2019; Interview 5/18/2019; Neupane 2019;

Pradhan 2012). Throughout the Rana period, which lasted from 1846 to 1951, the Ranas held near-absolute political control of the state, even though the members of the Shah Dynasty continued to hold a ceremonial role as monarch (Interview 5/14/2019; Pradhan 2012). The Shahs imprint on Nepal's statecraft, however, would prove to be longer lasting, with the heirs to the Shah Dynasty (descendants of Prithvi Narayan Shah) re-assuming greater political power in 1951, absolute political power from 1962-1990, and partial power again as kings and heads of state until 2008 (Interview 5/18/2019; Neupane 2015). Despite this, the Rana rulers of the late 19<sup>th</sup> and early 20<sup>th</sup> centuries left an indelible mark on the social relations, infrastructure and inequalities of the modern Nepalese state that have thus far outlasted any political dynasty of yore. While formal practices of slavery – enumerated in *Muluki Ain* of 1854 through the categories of *(na)masine*, ((un)enslaveable), – had mostly ceased by the end of the 1920s the code itself was not fully repealed until the middle of the 20<sup>th</sup> century, nor were the differential levels of codified punishment for offenders from different status groups (Mainali 2015; Interview 5/18/2019). Although a present-day quota system of affirmative action exists to provide more opportunities to historically marginalized groups and women, this system was only established relatively recently<sup>11</sup>, and mandated quotas are not always met in practice for high level

---

11 Although there were some efforts to make government and civil society more inclusive as early as the 1950s, these efforts were put on hold during the *panchayat* era of absolute monarchy. Ethnic inclusion was a central tenet to the Maoist movement's People's War from 1996-2006, and a reservation and quota system was first introduced following the conflict in 2007. The details of Nepal's reservation and quota system were a contentious focal point during the drafting of the 2015 Constitution of Nepal. The current constitution mandates quotas for government positions, the civil service, and representation in the political parties. Despite this, not all of the mandates are being followed as of the time of writing in 2021.

positions (Constitution of Nepal 2015; Interview 5/14/2019; Interview 5/18/2019; Khadka 2018).

The impact that Rana rule had on entrenching and exacerbating longstanding social inequalities is one of only many ways that their legacy is still being felt today across all of Nepal. Another enduring legacy of Rana rule more specific to the Kathmandu Valley is the impact that the Ranas had on the infrastructure and ancient Kirati water technologies that had endured through successive dynasties over millennia. Though only very limited public and community infrastructure was built and maintained over multiple generations of hereditary Rana prime ministers, the Rana elite did spend lavishly on their own personal needs and were strongly influenced and inspired by what they viewed as technologies of western modernity (Interview 5/14/2019; Interview 5/18/2019). Despite their concerns that extending new western technologies and infrastructure to the broader population would compel citizens to start demanding more western-style social and political reforms, multiple successive Rana Dynasty leaders attempted to commission infrastructure found in European capitols of the day, such as electricity and indoor plumbing and sanitation (Interview 5/18/2019). Construction began on the first modern piped water distribution system in the Kathmandu Valley in the 1890s, which brought fast-flowing surface water from the hills of Shivapuri near Sundarijal through a network of pipes to a holding reservoir at *Pani Pokhari* (GWP Nepal 2018). From there, the water was distributed through a second network of pipes into the palaces and residences occupied by the ruling Rana



elite, the ceremonial Shah monarch, and other wealthy and influential citizens with close personal relationships to the political leadership of the day (Interview 5/14/2019; Interview 5/18/2019).

The Rana commissioned water distribution system was soon supplemented by additional related technologies that had begun to proliferate during the Industrial Revolution in Europe. Because the Ranas' closest foreign diplomatic ties were with the United Kingdom, and because an increasing number of elite Nepalese soldiers had served in the British Army, the Rana prime ministers were well aware of the latest European technologies of the day. In spite of Nepal's isolation on the global stage and the Rana regimes' reluctance to undertake development projects on a larger-scale, Rana prime ministers often sought out British technical assistance and materials to build smaller-scale projects that would benefit the political elite (Interview 5/18/2019; Upadhyay 2012). For instance, the Pharping hydroelectricity project was completed in 1911, bringing power supply to many of the same cohort of elite households who had begun receiving piped water a little over a decade earlier (Interview 5/18/2019). This was followed by a water treatment plant, also built near the intake pipes for the previously completed water distribution system at Sundarijal (Upadhyay 2012). While much of this infrastructure was only built to serve a small, elite fraction of the Kathmandu Valley's total population, the chosen locations of this earlier infrastructure would play an instrumental role in shaping planning for larger-scale, public infrastructure projects in the present day.

While some of the infrastructure planning decisions made by the Rana rulers would shape where and how larger future projects were built, the Rana era construction of modern water systems to benefit local elites would ultimately play a critical role in undermining the viability of the much older water technologies that had sustained the general population for millennia. Despite the fact that the Kathmandu Valley's political leaders had enjoyed piped water and indoor sanitation dating back to the 1890s, most urban dwellers continued to rely on the ancient *hiti*, along with surface water supplies, to meet their basic household needs well into the 20<sup>th</sup> century (Interview 5/18/2019; Neupane 2015). Though this pattern would eventually change due to rapid population growth, and threats to the ancient Kirat water technologies, the *hiti* continued to be the primary source of domestic household water in the Kathmandu Valley's urban core through the end of the Rana era and beyond.

Although the *hiti* had provided a clean and reliable source of water to Kathmandu Valley residents for centuries, the Rana prime ministers made little effort to build new water sources for the general public, nor did they devote the resources to maintaining older supplies in the way that earlier dynasties had done. Moreover, the European-influenced piped water systems that the Rana built for themselves and for their close contacts, in some cases, disrupted the flow of water from existing *lakhamaka* (ancient reservoirs) into canals and conduits thereby limiting the flow of water into some of the *hiti* (Interview 5/18/2019; Neupane 2015). In other cases, leaky water mains

carrying sewage from newly-built indoor toilets in the palaces cross-contaminated sources of water flowing into the *hiti*, leading to a sharp decrease in water quality and an increase in disease (Interview 5/18/2019). Although the initial impacts of this new infrastructure on the much older indigenous water technologies was fairly limited – the Rana era piped water system was never very extensive in the first place – the shift in focus from spending state resources on maintaining indigenous technologies to building modern piped water systems would only accelerate over the following century.

While the ultimate collapse of the Rana Dynasty, and later the collapse of absolutist political rule, would create the enabling conditions for the benefits of modern piped water technologies to be shared more broadly, there remains a strong movement today to maintain ancient water technologies. These can serve as a potential insurance policy against a rapidly changing climate characterized by a higher likelihood that any one individual source of water could potentially fail (Interview 5/14/2019; Interview 5/18/2019). Ancient and contemporary water distribution systems do not necessarily need to be viewed as discrete entities. Just as the Rana era construction of piped indoor plumbing servicing political elites drew water away from existing *lakhamaka*, or reservoirs that supplied the *hiti*, so too can supplemental water gleaned through inter-basin transfers play a role in maintaining the viability of the *hiti*, which as of 2017-19 continued to serve as the primary source of domestic water for roughly 10% of households in the Kathmandu Valley and as a secondary source for another

10% (Nepal Census 2011; Participant-Observation 2017-19). Though almost all respondents I interviewed for this research are eagerly anticipating the arrival of more reliable, better quality household water supply, hardly any of those who continue to draw water from the *hiti*, even intermittently, have expressed any interest in seeing piped household water replace the *hiti* altogether.

For many Newari and other indigenous citizens, in particular, the continued survival of the *hiti* is viewed as integral to their own cultural identities beyond just being a matter of convenience, or an amenity that helps the urban poor (Interview 4/30/2019; Interview 5/14/2019; Interview 5/18/2019). Throughout multiple successive dynasties, periods of war and political unrest and through major natural disasters like earthquakes, the *hiti* have continued to flow, supplying household water free of charge (Neupane 2015; Tiwari 2016). Some interview respondents living in some of the Kathmandu Valley's most densely populated neighborhoods recalled that in the aftermath of the 2015 Gorkha earthquake, which devastated much of Nepal, killing more than 10,000, the water flowing from the *hiti* was the one source that continued uninterrupted, at a time when many more modern water mains broke and when water delivery tankers were unable to pass obstructed roadways (Interview 4/30/2019; Interview 5/18/2019). Other *hiti*, however, were indeed damaged by the earthquake, including the *Ga Hiti*, near the tourist district of Thamel, which supplied water to over 12,000 households a day before a multi-story hotel collapsed into it killing several people (Pradhan, Rai and Rupacha 2018). While *Ga Hiti* has since been

restored and once again provides water to tens of thousands every day, the long-term viability of the *hiti* themselves remains threatened. Many smaller *hiti* that have been damaged or dried up have not been restored, while dropping groundwater levels and climate change pose additional challenges to managing Kathmandu's ancient water infrastructure in a more sustainable, conjunctive and integrative manner.

In the chapter that follows I trace the daily lived experiences of water collection and water use in the present-day Kathmandu Valley, drawing attention to the multiple, inter-connected modes citizens employ to meet basic daily household needs. In doing so, I focus on enduring inequalities between multiple categories and classes of domestic water users, draw attention to the challenges of unpredictability in the timing of deliveries and in the available quantity and quality of domestic water, and finally focus my analysis on the labor performed by purveyors of informal water supply, who currently supply the bulk of domestic household water consumed by urban residents in Kathmandu. These daily water practices are mediated by factors such as social class, gender, housing stock and type, social identity, and location inside or outside the dense urban core, with the aim of this research being to investigate how all of these overlapping and interconnected factors influence the level of access to household water and the conditions of its collection.

***Chapter 2: Daily Water Practices and Micro-politics of Household Water Access in Kathmandu: An Ethnographic Approach***

Though the ancient water technologies of the Kathmandu Valley were sufficient to meet the daily household needs of urban residents over the course of centuries, in the present day citizens rely on a variety of overlapping sources and strategies to meet household water needs. Existing piped municipal water supply meets roughly 25-35% of the demand of residents of the Kathmandu Valley's dense urban core, depending on the time of year and the flow of surface water in channels like the Bagmati and Bishnumati Rivers. Throughout the course of this research from 2017-19, residents of the Kathmandu Valley navigated the challenges of securing sufficient quantities of household water through a dizzying array of modalities and strategies, often resulting in hardship, lost sleep and opportunities. Household water comes from bottles, jars, tanker trucks of varying quality at different price points, ancient stone *hiti*, manual pumps, borewells, communal wells with buckets, tubewells, flows from springs and surface water streams, harvested rainfall from rooftops, in addition to the piped supply of municipal water that comprises at least a quarter of household consumption in the valley's dense urban core. Household water comes in varying colors, quality and level of turbidity with most residents using different sources for different household tasks. Cleaner, clearer, but more expensive, jar water is used in most households for cooking and consumption, while lower quality water is commonly used for tasks such as laundry and cleaning.

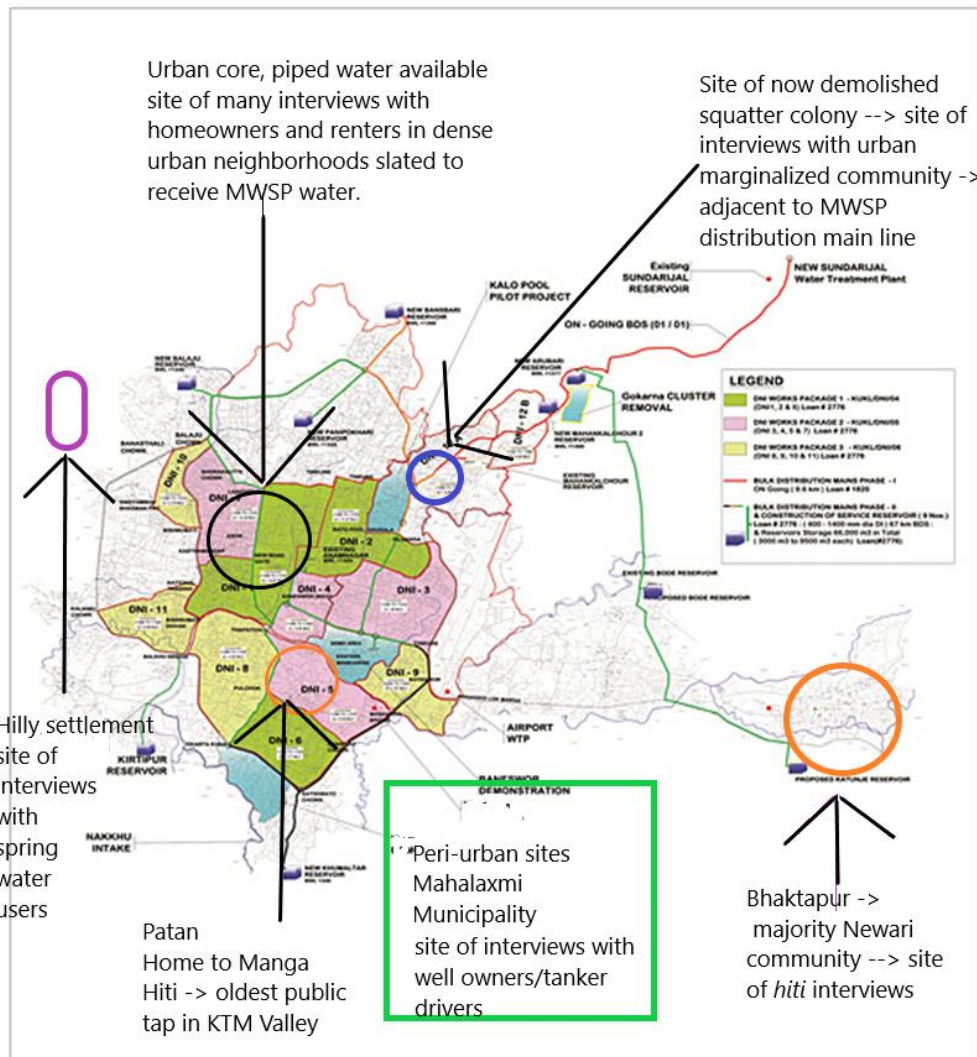
The purpose of this chapter is to tell the stories of daily water practices of residents of the Kathmandu Valley during the period of this fieldwork from 2017-19, and to examine critically how social variables such as economic status, geographic location,

type of dwelling, gender, age, native language and other indicators of identity intersect with various physical and infrastructural modalities of accessing water. Narrating these stories will illuminate the daily water micro-politics and practices of residents of the Kathmandu Valley and will allow me to situate their conditions of water access broadly along three primary axes of analysis: first, I examine how economic and social status interact with cultural identity and state recognition among residents of the dense urban core, drawing attention to the differential impacts of water access between registered housing, users of ancient taps, and an urban squatter settlement that lacks formal recognition by state authorities; second, I investigate more deeply the role of geographic location to elucidate distinctions between piped water access in core urban neighborhoods versus modalities along the peri-urban periphery, the latter of which remains outside the scope of the first phase of the planned MWSP network; finally, I investigate the intersection between domestic water and informal labor economies to draw attention to the potential and plight of informal water vendors and tanker truck drivers. While improving municipal piped water supply is often touted as a necessary step toward tackling urban poverty and inequalities (Molden et. al 2010; World Bank 2020), the aim of focusing these ethnographic narratives along these three axes for analysis is to draw attention to areas where conscious and deliberate policy-planning will be needed if the benefits of additional piped municipal water are to live up to their full potential.

In the remainder of this chapter, I draw upon participant-observation and a selection of 167 semi-structured interviews with 92 unique respondents conducted over the



course of this fieldwork to demonstrate how water inequalities are projected and mapped onto the lives different citizens in diverse ways, despite common struggles of addressing the challenges of critical household water scarcities. Interview respondents were given the option of selecting a pseudonym of their choosing, although a small number of respondents with especially common names requested that their real first name be used and some respondents participated in multiple interviews during the course of the fieldwork (n=167). A smaller number of core participants lived in close proximity to either of the two apartments where I stayed during the fieldwork period and would frequently stop to chat and update me on their household water situation. I have featured the interviews with these respondents most prominently, but also engaged in targeted sampling techniques to profile a wider range of water users across the widely variable physical and social geography of the Kathmandu Valley. Examining critically the physical and material conditions of household water access illuminates how social and economic variables intersect with geography, such as access to springs, wells and traditional water systems. Figure 2.1 below depicts how different categories of water users are distributed geographically, with their locations mapped onto the planned MWSP distribution network.



The black circle on the Figure 2.1 above depicts sites where I conducted interviews with core urban residents who already receive piped municipal water and who stand to gain the most from further water transfers. The blue circle represents the site of a now demolished squatter settlement, which although located in a dense urban setting directly adjacent to a MWSP water supply line, remains excluded from the expansion of the piped municipal network. Though this particular settlement no longer exists,

many similar settlements continue to line the riparian floodplain of Bagmati River – centrally located within the city, yet excluded from most basic public services. The orange circles represent sites of historical Newari settlements where a large share of residents continue to rely on the traditional *hiti* to meet their household needs. The green square approximates the location of Mahalaxmi Rural Municipality where I conducted interviews with peri-urban well water users and tanker truck drivers who operate in the informal water economy. Finally, the purple capsule shape represents a hilly settlement where spring water remains abundant.

In the sections below I draw on these interviews conducted in these various locations to illuminate the differential impacts of water scarcity on households in the Kathmandu Valley, depending on economic status and social identity, geographic location and physical modalities of water access. This will be followed by a discussion of informal water economies at the end of the chapter.

*Pani ko Dukkha or Water pains hath murdered sleep*

It's the middle of the night late in the dry season in the Kathmandu Valley. An elderly man who wanted to be called by the pseudonym Karma awakes, puts on his slippers and shuffles down several flights of steps in the hopes that the municipal water will be flowing as scheduled – the first such one-hour delivery in a week. Next door the neighbors slumber on peacefully, and even the roosters haven't started crowing yet. This wee hour wake-up to fill household tanks of water has long been a neighborhood routine, but recently Karma's well-heeled next door neighbor, Bhojraj, has stopped

using the municipal water altogether in favor of private tanker deliveries. Karma crouches down in the confined space behind the ground floor stairwell and puffs casually on a cigarette as he fumbles to start a loud electric pump. The pump shakes, lurches and sputters. “*Pani audaina*”, he exclaims. The water is not coming. Over the next hour, Karma tries the pump again several more times to no avail. It’s still dark, but by now the roosters are crowing noisily. The water hasn’t come.

Several kilometers outside the urban core where Karma and Bhojraj live, a married couple awake in the night, taking care not to wake their three sleeping children. Sita and Ram sit on a cool pre-dawn porch front sipping milk tea before Ram climbs into the cab of a rusted tanker truck and struggles to start the ignition while Sita begins tending to the chickens. After a short drive Ram picks up his assistant Rohit, an enthusiastic 14-year old boy, and they begin a two-hour drive to a rural riverbank to fill up the tank. As the sun rises, Ram and Rohit drive past long lines of local residents queuing to fill jars and jerry cans with water. Further beyond the urban periphery, the landscape changes and the long lines of queuing residents are replaced by much smaller groups of women and children gathering around continuously flowing spouts of spring water. Several of them drink the clean spring water directly from their cupped hands with little of the worry or risk that many urban dwellers face in securing adequate quality domestic water. After driving past a few smaller springs and streams, the truck arrives at a rocky, fast-moving river. Ram and Rohit park the truck and begin pumping water from the river into the tank.

Such experiences of waking up in the night to meet basic domestic and household water needs is a phenomenon undertaken by at least one person in nearly every home and structure in the core urban areas of the Kathmandu Valley. In some of the very wealthiest households in the valley, and in some of the largest, multi-family structures this task may be undertaken by a servant or a building manager. In some of the more sparsely populated peri-urban areas along the city's periphery, well and spring water may still be available in sufficient quantities to meet some basic household needs, but even most areas along the rural periphery import at least some supplemental water to meet basic domestic needs. Most households, regardless of income or social status, rely on multiple sources of household water over the course of the year, and indeed often over the course of a week.

*Pani ko Dukkha part II: Piped water in households in the urban core*

*(Figure 2.2 below depicts a dense core urban neighborhood in a ward of Kathmandu where many of the interviews for this research were conducted. While the households in this particular neighborhood all have access to the piped municipal water network, residents of the area all faced common struggles in securing sufficient quantities and quality of domestic water, with differential impacts based on wealth and economic status),*



*(Figure 2.2 Households with access to piped water in the municipal core)*

The stories of Bhojraj and Karma, of Ram and Rohit – stories of waking in the middle of the night to ensure that hands can be washed, that toilets can be flushed, and dishes cleaned – is a narrative so common, so mundane that it would hardly be worth mentioning, were it not for the level of uncertainty and insecurity about whether the water will come at all. Indeed, during the first months of this research some of the people who would later become core participants seemed somewhat bemused that I was spending so much time thinking, talking and writing about household water in the first place. When I mentioned to one such respondent the possibility of running out of water, my words were met with a loud chuckle and the remark, “but you can

always just call and someone will bring you some water. You're a foreigner, all you need to do is pick up the phone. Here are some numbers ... I can call for you if you like" (Interview 9/30/2017). By the time more time had elapsed in the fieldwork, I too began to question the banality of what I was doing. At that point the ritual of waking up in the night to turn on a pump and fill tanks at my own residence in Kathmandu seemed like it had provided me with about as much material for a dissertation chapter or two as the ritual of scrubbing pots and pans with water, soap and a sponge.

Nonetheless, the varied experiences of daily water collection continue to be shaped by economic status, gender, age, dwelling type and a whole host of other social and geographic variables. The very fact that the respondent mentioned above that I could always just call and someone would bring me water, if needed, was indicative of that respondent's perceptions of my own economic status, social class and general privilege as a foreigner from a country with a higher median level of income.

Moreover, many of the poorest and most marginal respondents I spoke with, along with many older respondents, never took for granted that the water would just be there, even with money and a working phone.

Two of the respondents that I interviewed most extensively – Karma, the Tibetan refugee, and Bhojraj, a Bahun landowner – both viewed their labor in performing water supply maintenance as part of their duties as a landlord. Like many smaller landholders in Kathmandu, Karma and Bhojraj both built large multi-story houses where they live on one floor of the house, and then rent the other floors out for supplemental income. Whether tenants pay water fees is negotiable, although more

expensive rentals tend to be more likely to include water supply in the rental price, while in less expensive rentals the tenant is generally responsible for the cost of water (Interview 1/23/2018; Interview 1/28/2018; Participant-Observation 9/2017-3/2019). Although both Karma and Bhojraj performed nearly identical tasks in waking up in the night to supply water for their respective buildings, their attitudes toward the drudgeries of water collection diverged greatly. Karma, who had known extreme scarcity during his migration to Nepal, worried deeply about the water running out and held largely pessimistic attitudes toward the future. Bhojraj, who had been raised in a prominent local landowning family, expressed much more optimistic views stating, “If Melamchi [water] comes, everything will be easy. Even if Melamchi never comes, there will always be water if you have money” (Interview 1/28/2018). These words echoed the sentiments expressed by the relatively well-off younger respondent described in the paragraph above who had questioned why I was concerned about running out of household water just a few months earlier. In both cases, these two respondents viewed the prospect of running dry as an inconvenience that could be remedied quickly with a phone call rather than an existential matter of life or death.

During one of my first sets of interviews with Bhojraj and Karma, I learned more about both of their personal histories and the history of the neighborhood where they both lived. The two had houses on opposite sides of a narrow lane that was lined with densely built multi-story houses with tall gates out front. Most of the houses on the lane had multiple families living inside, typically with the homeowner’s family occupying one floor, and renters occupying the other floors. The lane was situated



atop a hill with a series of steep stone steps connecting it to a larger thoroughfare further below. The lane was too narrow for automobile traffic, but could be reached by motorcycle by taking a much longer, roundabout route to reach the lane without having to ascend the steep stone steps. Because of the hilltop location, ancient *hiti* and other indigenous water infrastructure had never reached the land in this area, even though the neighborhood itself was located in the central urban core of Kathmandu. Until the early 1990s slopes of this hill were used for rain-fed agriculture (Interview 11/2/2017; Interview 11/4/2017). Wheat and other dry-climate vegetables were grown during the winter dry season, while paddy was cultivated during the summer monsoon. Mango trees produced fruit in the wet summer months, orange trees in the dry winter months, while bananas and lemons were available year-round. Historically the hilltop land was owned by Bhojraj's family and passed down from generation to generation through patrilineal inheritance (Interview 11/5/2017). Starting around 1990, Bhojraj's father had begun sub-dividing the family land into smaller plots to sell for the construction of houses to meet the demand of Kathmandu's burgeoning urban population (Interview 11/5/2017). Bhojraj lived with his wife and two children in a tall house at the top of the hill and operated a nearby *kirana pasal*, or neighborhood shop, selling everything from fruits and vegetables and jars of water to household cleaning supplies, tobacco, toiletries and LPG cooking gas. The *kirana pasal* also played a central role as a neighborhood gathering point, with local residents lingering around out front from dawn until dusk chatting with Bhojaj and getting caught up on the latest news and gossip. Although Bhojraj owned his own

house, the *kirana pasal*, and served as a landlord to a small *bhatti*, or hole-in-the-wall neighborhood eatery, most of his family's historical farmland in the neighborhood had already been sold to other homeowners during a building boom in the 1990s (Interview 11/2/2017; Interview 11/5/2017).

Karma, the Tibetan migrant, had built a three-floor house directly across the lane from Bhojraj's home in the late 1990s after more than two decades of living in much more spartan conditions in a refugee resettlement camp several kilometers away (Interview 11/2/2017). Unlike Bhojraj, who viewed the challenges of acquiring household water in the hilltop neighborhood as an inconvenience that could be solved with a quick phone call to a private vendor, Karma expressed deep concern not only about the prospects of not having water to meet personal needs, but also that current patterns of urbanization and economic development in Nepal, and elsewhere, could not be maintained for very long. Reflecting on his own experiences of settling in Kathmandu many decades earlier, Karma told me in our first interview:

- When I first came to Kathmandu in 1972 the water was very clean. The air was clean. In those days we all just bathed in the river, swam in the river. We could drink and eat fish from the river. We all just walked when we needed to travel somewhere. No [motor]bikes. No cars. No buses, And now the water is poisoned. The air is poisoned. And now the farmers are using chemicals. They are all using chemicals. But they don't know how to use them. They are not very educated, these farmers. They don't know how to use the chemicals, so they are spraying chemicals everywhere. On everything. And now the water and air are

poisoned. And it's all because of that company ... You ... Your country's company... The company that made the Agent Orange for Vietnam

- Monsanto? I interject
- Yes, not only Monsanto. Many companies. Many foreign companies are giving the farmers chemicals. and they are spraying the chemicals and poisoning the air and water. And for what? For a little more money? It's all capitalism now. It's your country's capitalism. And it's poisoning the planet. I hate ... It's terrible ... I hate it. (Interview 11/2/2017)

Karma's narration about the deterioration of water sources and environment in the Kathmandu Valley was consistent with recent scholarly studies that have examined the fall of groundwater levels, sharp increases in pollution and the biological death of large sections of the Bagmati and Bishnumati Rivers (Chinnaswamy and Shrestha 2019; Ishitaque, Shrestha and Chhetri 2017). Among respondents I interviewed for this portion of the fieldwork, Karma stood out for his pointed critique of foreign, and especially US-backed, capitalism as an explanatory cause for why the water situation in Kathmandu had deteriorated to the point that it had. These views are broadly consonant with perspectives in the critical literature of water and society that write of the contradictions of capitalism and the impact of neoliberal policy reforms in the agricultural sector on water and soil pollution and quality (Bakker 2013; Escobar 2017; Robbins 2004). It would only be in later interviews that I would learn that Karma also watched BBC World News for hours every day on a satellite television

network, making him among the best informed of any of these interview respondents from any educational background when it came to knowledge of current events in the English-speaking world (Interview 1/28/2018; Interview 3/8/2018). Nonetheless, these views on agricultural fertilizer and pesticide use set Karma apart from many of the small-scale farmers I would later interview in the Melamchi Valley. During the following year, hundreds of farmers from Sindhupalchok District – where Melamchi is located – would stage a mass protest against the perceived failure of the government to ensure that previously agreed upon quantities of commercial fertilizers and pesticides were available at heavily subsidized prices (Interview 6/8/2019; MyRepublica 6/3/2019).

On a nearby street to the one where Karma and Bhojraj live, some of the larger landholders rely on the labor of hired help to perform water system supply and maintenance rather than do any of the work themselves. One such landholder, Ismail, owns a building that houses a tandoori and biriyani restaurant on the ground floor with six floors of rooms and flats rented by tenants above. Unlike Bhojaj and Karma, who both live in the same building as their tenants, Ismail lives in a sleek, modern newly-built house a short motorcycle ride away down a twisting, turning narrow lane. Next door to the house where Ismail lives with his family, stands a massive, modern four-level house made of concrete and glass with a large open-air terrace and deck framed by castle-like turrets. This house is occupied by Trishna and Kumar, a mathematics professor at a local university, who share the palatial residence with Ishwor, an orphaned 15 year-old boy who serves as a domestic worker to the couple,

while Trishna and Kumar's own children have already married and started households of their own. Although Trishna, Kumar and Ismail all speak of the challenges of collecting domestic water for their buildings with a mix of frustration and exasperation, all three of them have wealth and the privilege to avoid having to wake up in the middle of the night to start the pumps and fill the tanks themselves.

I was first introduced to Ismail through a friend at a local university who was renting a small room on the top floor of Ismail's building, six floors above a tandoori restaurant. My friend and I had just trudged up the seven flights of stairs to the building's open rooftop when we saw Ismail spreading a dark, hairy-looking object out across the brick and stone. A strong, pungent smell instantly hit my nostrils.

Ismail then noticed me and replied in fairly proficient English, "I am sorry for this smell. My wife doesn't want me drying out this goat hide at our house. I will use it to make a rug so I brought it here to dry" (Interviewa 10/18/2017). After my friend introduced me to Ismail and told me about my research, Ismail quickly called up the staff from the restaurant on the ground floor and told me that if ever had any questions, or wanted to observe daily water issues at the building just to talk to them. It turned out Ismail had spent several years living and working in Turkey and Saudi Arabia as a younger man and appeared to be well-known and well-respected within the neighborhood's tight-knit Muslim community as someone with robust overseas employment connections, and as a patron of charitable causes. His restaurant staff of four – all males ranging in age from 14 to 27 years old – shared a room above the kitchen where they stayed every night, except during holiday periods when they

would return to their hometowns to visit their relatives. The four staff would alternate getting up in the night to perform water maintenance tasks, such as pumping water from underground storage tanks set in the building's foundation to smaller rooftop holding tanks, filling the underground tanks with municipally supplied piped water on nights when it was available, and scheduling private tanker deliveries in between public water deliveries. These tasks had to be done more often than in smaller houses – with pumping performed on a daily basis– given the number of people living in the building and given that municipal piped water was only available for about two hours every seven to ten days during the research period (Interviewb 10/18/2017; Interview 10/25/2017).

Residents of multi-family buildings in the urban core like the one owned by Ismaïl stand to reap significant benefits from the arrival of imported water, affecting both landlords and renters alike. Private water deliveries for a building this size can cost more than \$100/month placing additional hardships on those who live there.

Moreover, the flow of heavily subsidized, piped municipal water would only take place sporadically and in the middle of the night, forcing someone in the household to wake up to fill storage tanks for the days ahead. For larger buildings this municipal supply was insufficient to last seven to ten days between deliveries, making the reliance on tanker trucks a matter of necessity rather than a matter of convenience. Though landlords would sometimes perform water collection duties, in other cases the burden would fall on poorer, more marginalized renters and staff.



*(Figure 2.3 (above): Many owners of larger houses rely on staff to perform water collection tasks, photo by author)*

It wasn't until the following spring that I saw for myself the house where Ismail lived with his own family and met his children and some of the neighbors. Though Ismail mentioned that he took turns waking up to do water duties at his house with his own college-age son and high school-age daughter, the older couple in the palatial house next door, Trishna and Kumar, had a live-in foster child *cum* servant perform daily water duties. When I first spoke with Trishna about her family's water arrangements she mentioned that she and her husband had found Ishwor, then a young orphaned boy, begging along a roadside in a rural area several years earlier and had decided to bring him back to Kathmandu with them (Interview 3/7/2018). Trishna stated that she had tried hard to help raise Ishwor, provide food, clothing and shelter, and send him to school but that "he just doesn't have the same natural ability to learn and be a good student that my own children do" (Interview 3/7/2018). Trishna went on to mention that her husband was a math professor and that her family owned several rental properties on their ancestral land, while their own children were already college educated, married with children and living in houses of their own. When I asked whether Ishwor would likely attend college too, Trishna simply sighed and murmured a phrase that translates roughly as "I don't think it's in the cards for him" (Interview 3/7/2018). Trishna then invited me up to her large terrace and rooftop deck, which were covered with an assortment of hundreds of potted plants, flower beds, climbing vines and trellises. As we sat sipping tea, Ishwor walked back and forth carefully watering the plants, pruning the vines, dusting the railings and sweeping the floors. Trishna briefly stood up to inspect that all the dust had been cleared from behind a



corner, before sitting down and remarking, “he’s not so clever like my own children, this boy, but he sure can help around the house” (Interview 3/7/2018). Ishwor blushed and then turned and sheepishly looked away.

Back on the street where Karma and Bhojraj lived a crew of laborers from Kathmandu Utapakya Khanepani Limited (KUKL), the municipal water department, were going from house to house to do an inventory of where PVC pipes had already been installed to provide household connections to the main where Melamchi water would one day flow. Many of these PVC pipes were protruding into the air from blocks of concrete from which they had been installed. In some cases, the PVC pipes were visible from the public lanes themselves, but in other cases they had been installed in private courtyards behind gates and walls. Upon reaching the lane where Bhojraj and Karma lived, the work crew first rang the bell outside Bhojraj’s house, waited for one of the tenants from the building to come and open the front gate to the courtyard (Bhojraj himself was staffing his shop at the time), and then recorded the house number and serial number of the connection on a piece of paper attached to a clipboard. Upon ringing the bell to Karma’s house, a voice called out, “Who are you and what are you doing here” (Participant-Observation 9/13/2018). Once the crew remarked that they were from KUKL and they were doing inventory on behalf of the MWSP, Karma quickly ran down the stairs and opened the front gate in a hurry. “The Melamchi water is here? It’s finally here?”, he inquired, with an incredulous look on his face. “For many years I have waited. The politicians haven’t been any good. So the water has finally come...” (9/13/2018). “No sir. Not yet”, remarked one of the

crew. “Why are you here then? Only to tell me there is no water? I already know there is no water. The public supply never comes when I am told it will. Please leave. Don’t come to my house again only to say there is no water... “ (9/13/2018).

Such frustrations around the inadequacies of municipally supplied water have prompted residents to adopt a number of strategies to address shortfalls from the public water system. Though many residents in the oldest, historical neighborhoods of Kathmandu and Patan continue to rely on the ancient *hiti* or stone spouts as an alternative to municipal water supply, for most households that participated in this research, tanker truck and jar deliveries from private vendors remained a critical source of supplemental water. Reliance on such deliveries varies across communities and over the year, with a heavier level of reliance on these sources during dry season months when municipal water supply is less reliable. Many households arrange for private tanker deliveries throughout the year as a more predictable alternative to municipal supplies that flow only one to two hours every seven to ten days. Some larger commercial properties, such as upscale hotels, may rely only on private tanker deliveries. The price of these deliveries can vary according to the quality of the water being supplied and the time of year, with prices spiking as the dry season wears on. Among households purchasing the more expensive tanker water, there was a widespread belief that this water was better quality than the existing public supply. Bhojraj, for instance, stopped using public water in his building altogether during the course of this research after concerns about inconsistent quality and contamination of municipal water deliveries (Interviews 10/21/2018; 7/15/2019). “Maybe when

Melamchi comes I will stop buying this water, but nothing is certain, and this water [tanker water] is at least cleaner and more reliable” (Interview 10/21/2018). Though relying exclusively on private tanker water can be cost-prohibitive for many households, for those who can afford it the tanker deliveries eliminate the need to wake up in the middle of the night for water that may or may not come, adding a level of convenience for many of the city’s wealthier residents.

Gurung et. al’s (2017) study finds that investments and expenditures in private supplementary water infrastructure have greatly reduced the average time burden spent by many Kathmandu Valley households performing water collection since a large-scale baseline study was first conducted in 2000. Since that time, however, inequalities surrounding water access have increased as richer households have had greater opportunities to improve their water security through private, household-level investments. For example, Bhojraj mentioned that he had a large underground holding tank built beneath his house that can store five thousand liters of water for the building (Interview 10/21/2018). This enables him to go several weeks between tanker truck deliveries, reducing the frequent need to take time out of his schedule to arrange and wait for tanker deliveries. It also enables him to pay a lower unit price per liter than households with smaller storage facilities pay (Interview 10/21/2018). Bhojraj has a smaller, one thousand liter plastic tank on his rooftop from which water flows into the rest of the house via gravity. He maintains an electric pump with motor to lift water from the larger underground holding tank to the rooftop tank every few days. Unlike neighbors who still wake up in the middle of the night to fill their tanks

with municipal water, Bhojraj can perform this task at any time that's convenient for him. All it takes is the flip of a switch and within a few minutes the rooftop tank is full again and ready to supply water to the building for the next few days (Interview 10/21/2018).



*(Figure 2.4: Black 1000-liter water storage tanks are seen on rooftops of houses in a dense urban neighborhood)*

More recently, a number of households have also begun investing in rainwater harvesting systems to provide supplemental water for non-consumptive, domestic use. Unlike Bhojraj, Karma continued to rely on the municipal water supply throughout the course of this fieldwork, though he did add sloping sheets of corrugated metal to his otherwise flat rooftop just before the start of the monsoon season of 2019 in an effort to harvest rainwater from his rooftop (Interview 5/15/2019). He then built a homemade gutter system to channel the rainwater into a series of barrels, which he used as a source of water for household cleaning and washing (5/15/2019). In a follow-up interview about the rainwater harvesting system, conducted shortly after heavy seasonal rains had begun, Karma mentioned how he had used some of the surplus rainwater to start a small herb garden on his terrace – something he would never had considered using the scarce municipally-supplied water to grow (Interview 6/13/2019). Such households across the Kathmandu Valley, like the ones where Bhojraj and Karma live, thus obtain domestic water through evolving and multiple modalities that are mediated by both biophysical and social factors (Gurung et. al 2017; Prakash and Molden 2020). While economic status enables some residents to invest more heavily in supplemental water infrastructure, these investments are also limited by physical constraints. For instance, the hilltop location of the lane where Bhojraj and Karma live preclude them from drilling a well to extract groundwater, as many wealthier households in lower-lying areas have done. Nonetheless, the fact that homeowners like Bhojraj and Karma can invest in water storage infrastructure, or that even wealthier residents like Ismail and Trishna and

Kumar pay others to perform water labor, enhances their water security, while reducing the drudgery and constraints of these basic every day tasks (Crow 2007; Prakash and Molden 2020).

Residents of dense urban core neighborhoods, like the ones described in this section, rely on a variety of modalities and strategies to access household water, depending on their economic status and willingness to wake up in the middle of the night to engage in the drudgery of collecting and storing water from the piped municipal supply.

Nonetheless, all of the households described in this section stand to benefit directly and imminently from the arrival of additional public piped water supply made possible by inter-basin water transfers from the Melamchi River. Even some of the research participants from these neighborhoods, like Bhojraj, who expressed the lowest level of willingness to collect publicly supplied water for his home suggested he would return to the piped municipal supply upon the arrival of imported MWSP water. Given that the cost of this water is heavily subsidized, households in these core urban neighborhoods should also expect to see cost savings if they shift more of their consumption from private sources, such as tanker deliveries, to the piped municipal network. Nonetheless, many of the homes that stand to benefit the most from the arrival of imported Melamchi water already possess more wealth and resources than the median for the region. Many lower-income households in core urban neighborhoods either continue to rely on the threatened but free ancient *hiti*, or are excluded from the piped municipal network altogether, as I will describe in the following sections.

*Whither hiti?: Traditional water systems in dense urban neighborhoods*

In poorer households, the cost of obtaining sufficient quantities of high-quality water can be prohibitive, compelling some citizens, disproportionately older women, to expend large amounts of time and physical effort to collect water from dwindling and more heavily contaminated sources (Gurung et. al 2017). Although the ancient *hiti*, or public stone taps, of the Kathmandu Valley proved to be reliable sources of clean water over the course of many centuries, in recent decades their flow has diminished while cross-contamination with domestic sewage and industrial pollution has increased in many places (Prakash and Molden 2020; Tiwari 2016). The construction of private water mains and sewerage systems to serve Rana era elites during the first half of the 20<sup>th</sup> century, and the later haphazard construction of water systems during the Panchayat era, led to many instances where newer pipes carrying sewage dripped or leaked into the ancient *tilamaka* canals supplying the communal *hiti* taps.

Nonetheless, water quality across the couple hundred or so remaining *hiti* of the Kathmandu Valley varies widely, with some such taps much cleaner than others. In the present day these ancient taps continue to serve as a primary water source for roughly 10% of households in the urban cores of Kathmandu, Patan and Bhaktapur, while they serve as a secondary source of household water for another 10% or so of households (Nepal Census 2011; Neupane 2015). More newly built neighborhoods, like the ones where Bhojraj and Katma live, are not served by any *hiti*, nor are hilltop neighborhoods or peri-urban areas. Nonetheless, for households in the oldest core neighborhoods of the Kathmandu Valley – especially those populated by the valley’s

native Newari communities – the *hiti* continue to fill a dual role both as household water source and, often, as neighborhood gathering point for older members of the community.

Although I first visited *Manga Hiti* – the oldest continuously flowing public tap in the valley now in service for nearly 15 centuries – during the first year of this fieldwork, it was only when I returned with a local female friend and collaborator later on in the fieldwork that I was able to garner more detailed information about the daily practices of the mostly elderly women who rely on these public taps as a primary source of household water. Subsequent visits to Bhaktapur – the ancient city roughly 16 kilometers east of Kathmandu where more of the population continues to rely on *hiti* for their household water needs – illuminated further details about the role these taps continue to play within the Newari community. It was just after sunrise on a warm, humid morning just before the arrival of the monsoon rains. Despite recent afternoon thunderstorms of the pre-monsoon that had left the lanes and alleyways thick with fresh mud, the water flowing from an ancient *hiti* at a square in the historic city of Bhaktapur was barely a trickle. A group of roughly a dozen or so women were gathered around the tap, patiently waiting their turn to fill their bottles and jars with water, while chatting with one another in the Newari language. Although the Newari people are the native ethnic group of the Kathmandu Valley, in the present-day they comprise only roughly one quarter of the total population, while an even smaller share still speak the Newari language as their first tongue (Nepal Census 2011; Prakash and Molden 2020). Nonetheless, the Newari language was the primary



language spoken among water collectors using the ancient *hiti* in Bhaktapur, as well as in older historical neighborhoods of Patan and central Kathmandu.



*(Figure 2.5: Residents of the historic Newari city of Bhaktapur collect water from an ancient hiti. Plastic tanks and PVC pipes have replaced the historic canal system here, due to damage during road construction)*

Unlike the houses of Bhojraj or Karma, which both had relatively large water storage tanks, the women filling up their jars and jerry cans at the *hiti* only filled as much as they could carry back with them, with several making multiple trips during the course of the day. At the *hiti* in Bhaktapur that appeared to be merely trickling, it would take roughly ten minutes to fill up a single 20 liter jug of water, with most of the women using this tap waiting up to a few hours at a time for their turn to collect a relatively small amount of water (Interview 5/20/2019; Participant-Observation 5/2019). After my friend and I asked them in the Nepali language how often they made the trip to collect water, the women grew curious and asked us where we were from, given that

neither of us spoke the unrelated Newari language. A couple of the women mentioned that they made the trip at least twice a day to collect water, but that it was generally busiest at that time of the morning and that they enjoyed the opportunity to get out of the house for a while and socialize with old friends (Interview 5/20/2019). One frail-looking woman stayed the entire time chatting with her neighbors, but eventually took out a basic handheld mobile phone to call her daughter to help her carry the water back to the house when her turn came to fill up jars at the tap. Another mentioned that she alternated taking turns to collect water with her nieces and her daughter, but that her daughter had recently given birth so she was avoiding collecting water from the public tap for the time being, in accordance with local custom. When asked whether any of their children had missed school to collect water, no one answered affirmatively, but a couple did mention that they woke up their children a couple hours before sunrise so they could begin collecting water and start household chores before the school day started (Interview 5/20/2019). Such time-consuming practices associated with the collection of household water can be more than merely an inconvenience or drudgery and are often associated with unequal educational and employment incomes between richer and poorer households (Crow 2009; Prakash and Molden 2020). These practices take even longer when the flow of water is insufficient or disrupted.

One topic where there was broad agreement was that the flows from the *hiti* had diminished greatly in recent decades, with several of the older women, in particular, mentioning that during their own childhoods the water flowed much faster with it

taking less time to fill up jars and bottles (Interview 5/20/2019). Two of the women mentioned they had previously used another nearby tap when they were children, which had since dried up. Another resident pointed with her hand, gesturing up into the nearby hills, to show where one of her cousins farmed on land that had natural spring water available. “Up there the water is fast and clean”, she remarked in heavily accented Nepali (Interview 5/20/2019). “Down here we have big water problems now, even during the rainy season” she continued. Several of the other women nodded with one mentioning that while problems had started as long as 30 years ago, it was only in the past ten years or so that the water was reduced to a trickle. “But now many people buy water from the trucks. Or they dig wells. We like our traditions and our stone taps, but it just takes too much time to collect water these days. I fear that for our grandchildren our way of life will be gone” (Interview 5/20/2019). Some of the other water collectors nodded, with one stating that the cost of tanker water was simply too expensive and that she was grateful she could still collect water from the ancient public taps for free.

Although many of the ancient *hiti* in the core neighborhoods of Patan and Kathmandu are located in neighborhoods that are slated to be served by MWSP water once the project is complete, the neighborhood in the ancient city of Bhaktapur where the interviews these women were conducted lies outside the scope of the first phase of Melamchi water deliveries. In contrast to the more cosmopolitan Kathmandu city, Bhaktapur retains a stronger Newari character and the ancient *guthi* or social trusts here play a much more prominent role in maintaining the *hiti* and providing for the

general welfare of elderly members of the Newari community, in particular (Interview 5/14/2019; Interview 5/20/2019). Nonetheless, the willingness of the community to work together to maintain this historic infrastructure will be futile if the surface and groundwater reserves are depleted to the point that there is no water in the system in the first place. Anecdotal evidence from these interviews about residents building wells and about the flow of water being reduced is consistent with evidence from recent scholarly work on groundwater depletion in the Kathmandu Valley brought about by rapid urbanization and burgeoning population growth (Chinnaswamy and Shrestha 2019; Ishtiaque, Shrestha and Chhetri 2017). Although the challenges of groundwater and surface-water depletion impact ancient and new water systems alike, threatening the very existence of the ancient *hiti*, it is in the most marginal neighborhoods and communities – especially those without formal recognition by government authorities – where the impacts of these challenges are felt the most acutely.

*Daily water practices in an urban squatter community: Geography and informality*

Many of the interviews I conducted during the course of this fieldwork were achieved through snowball sampling techniques, building on contacts made through friends, neighbors, and students and staff at local universities. Nonetheless, had I only conducted interviews with respondents made through these contacts, the sample of respondents likely would have skewed toward those with levels of income and

education above the local average. During the course of conversation with many more affluent and educated residents, I would often hear statements similar to those reflected in the academic literature, such as the notion that poorer households stand to gain if the water economy shifts from informal to formal (Gurung et. al 2017; Interview 2/15/2018a; Prakash and Molden 2020). And indeed many lower-middle income households that fall within the planned Melamchi grid network will likely reap significant benefits from the eventual availability of subsidized MWSP water. The overall augmentation of public supply is expected to improve access and conveniences for tens of thousands of households, while reduced demand for tanker deliveries amid new public supply may indeed put downward pressures on the prices of water as a share of household income (Gurung et. al 2017; Prakash and Molden 2020). While some of the most marginal informal settlements inside the ring road will not directly benefit from MWSP water, they too may experience other indirect effects such as potentially lower private water tariffs and cleaner water flowing in local rivers like the Bagmati and Bishnumati upon which some of the poorest households depend for washing and bathing. In contrast to many larger South Asian metropolises unrecognized, informal squatter settlements make a relatively small share of the Kathmandu Valley's urban population. One (2014) estimate put the total number of residents living in such dwellings at 7% of the population. One NGO representative mentioned he believed this number might be closer to 10% of the population, but nonetheless lower than comparable cities in the region (Conversation 2/15/2018a).

My own knowledge of the lived experiences of water access in some of the most well-established squatter communities that line the riparian floodplain of the Bagmati and Bishnumati rivers is limited by my own role as an outsider and the strong distrust among many community members of outside authority figures, including government officials, medical doctors, and researchers. During two years of fieldwork in Kathmandu, I was able to interview a handful residents who lived in squatter communities and who worked as daily wage laborers in the informal economy. These semi-structured interviews took place in central commercial areas of Kathmandu where many daily wage earners make a living performing tasks such as carrying loads from a wholesale market to small shops in the historic city core, peddling various items, and cleaning and fixing shoes. These semi-structured interviews were accompanied by brief visits, upon invitation of a resident, to an informal squatter settlement adjacent to a MWSP distribution mainline that would later be demolished by municipal authorities during the course of this fieldwork. The settlement where I conducted portions of this fieldwork was a relatively new, and short-existing one in contrast to longer-established informal settlements along the river banks, which have been an integral part of the urban landscape for decades in Kathmandu and whose inhabitants are much more resistant toward outsiders than in the settlement where this research was conducted.



*(Figure 2.6 (above): Many core urban squatter settlements remain excluded from the MWSP piped network)*

During the first month of the fieldwork I met Ajay for the first time in a central commercial neighborhood of Kathmandu city where he was mending broken shoes – historically a job performed by people from the lowest social status groups. As a migrant to the city from Rajasthan, India, Ajay would come to be a core participant in the research, providing detailed accounts of day to day conditions in the settlement where he lived with his wife and five children, and also the perspective of a resident who was himself perceived as an outsider and foreigner by his own neighbors. I chatted with Ajay briefly, asking him some basic questions about his children’s education, his day-to-day work, and about the challenges of accessing water in the settlement where he lived. As Ajay began to describe the struggles that his family faced in accessing water, a group of bystanders interjected that this Indian shoe-

cleaner was no good, that Indian migrants, in general are cheats, and that I would do well to ask them their perspectives instead, if I am interested in learning what Nepali people think. (Interview 9/16/2017).

Hearing such sentiments was not uncommon throughout the course of my research, not only toward migrants from across the border in India, but also toward non-Nepali speaking citizens of Nepal who had recently migrated from the Terai, the flat, swampy expanse along Nepal's southern border with India. The overwhelming majority of the Kathmandu Valley's residents belong to various ethnic and status groups from the Middle Hills of Nepal, with Hill Brahmans (*Bahun*) the most numerous group in Kathmandu city proper, and Newaris the most numerous in Bhaktapur and rural areas of the Valley (Nepal Census 2011). Historically, the three kingdoms of the Kathmandu Valley (Kathmandu, Patan, and Bhaktapur, collectively known as Nepal Mandala) were populated by the already-hybridized Newari ethnic community – a name given to all descendants of those who were already in the Kathmandu Valley before it was conquered by the Gorkha kingdom in 1768 (See chapter 1 for a more detailed history). The Newari community, itself derived from earlier waves of indigenous Kirat and later Sanskrit-speaking settlers, is far from monolithic with its own complex social hierarchies based on the four Hindu *varnas*, and a highly specialized urban division of labor unseen elsewhere in the Middle Hills region of the Hindu Kush Himalaya (HKH) (Conversation 10/21/2017). Recent years have seen mass migration of hundreds of ethnic groups from all regions of Nepal to the Kathmandu Valley, resulting in a highly diverse and multicultural population, but



one where social stratification and hierarchies stubbornly persist. Though the proportion of residents living in unregistered housing is comparatively small in Kathmandu, those who do inhabit such dwellings face numerous additional challenges as a result of their position of marginality and exteriority, with water access being one of the greatest challenges for residents of such settlements.

During the first few months of this research, I would see Ajay, the Rajasthani shoe cleaner and cobbler, almost everyday. Ajay would sit from dawn until dusk on a small piece of cloth fabric placed over the dusty ground near the entrance of a major bus stand in the city center. Occasionally, I would see him tending to a customer or two, but most of the time he would be sitting cross-legged on the ground, patiently waiting in the hopes that a passer-by or two would stop and avail of his shoe repair services. One day early in the research, I was invited to Ajay's home after he had learned that I had visited his hometown in Rajasthan nearly ten years earlier. A lengthy local bus ride brought us to a squatter settlement on the edge of the city's built up area. About 40-50 families were living in makeshift shelters on an empty patch of dirt. Only later would I learn that the Kathmandu Metropolitan City (KMC) authorities had already had plans in the works to raze the settlement and re-locate the squatters elsewhere – plans that would come to fruition during the course of this fieldwork. On this first visit to Ajay's home, however, the trappings of the administrative state were nowhere to be seen, with families relying on social ties and informal arrangements to procure the most basic of services.

When I arrived at Ajay's home, his wife Aarti, and two youngest daughters were present, one a toddler and the other four years old. Ajay proudly proclaimed that his three older children, two girls and a boy, were currently in school, and he was very pleased with them because they were learning how to read – something neither he nor his wife had ever done. Ajay explained to me:

*When I was a boy in India my parents were both beggars. When I got older, other boys went for work, but I went for begging. Now I want my children to go to school and work, so I am working, because I want my children to work. I want a better life for them and I need to work too to provide a better life.* (Interview 9/16/2017).

When asked whether daily water collection posed a big challenge to their household, Aarti replied that it was a major challenge and that her two older daughters woke up before dawn every morning to help her carry jerry cans of water from a tanker delivery point hundreds of meters away back to their household (Interview 9/16/2017). Moreover, Ajay and Aarti remarked that what water was available was of low quality and Aarti was concerned that one of her daughters had developed a rash a few weeks back after washing with this water (Interview 9/16/2017).

Like many residents of the squatter colony, Ajay and Aarti depended on a variety of informal arrangements to access public services. The drudgery and the challenges associated with waking up early to wait for water that doesn't come in necessary quantities to meet basic needs often forces residents like Aarti and Ajay to forego

water uses that are critical to maintaining public health such as washing and cleaning clothing and dishes – challenges faced by many of the world’s most marginal populations whose settlements lack legal recognition by government authorities (Crow and Odaba 2010; Crow and McPike 2009; Interview 9/16/2017; Speer 2016; WHO 2019). Although many aspects of Aarti’s daily water routine bear resemblance to the practices of the Newari women in Bhaktapur who also spend lengthy amounts of time collecting water from the ancient *hiti*, there also exist several key differences that make Ajay and Aarti’s access to water more precarious. First and foremost, the water flow at many of the *hiti*, though low compared with historical levels, provides a free source of domestic water that continues running 24 hours a day to anyone in the neighborhood. Moreover, these *hiti* are maintained regularly by the *guthi*, or social trusts, which have provided for the general welfare of the Kathmandu Valley’s indigenous populations for more than two millennia (Neupane 2015; Tiwari 2016). Furthermore, the valley’s native Newari population, in particular, is often comprised of close social ties based on kinship and ancestry, providing additional social support and community recognition than many residents in informal settlements have, most of whom have ancestral origins much further afield.

The squatter colony where Ajay and his family lived fell just within the boundaries of the municipal water network, but because of lack of any formal recognition of residents’ land tenure regular public services were not available. This resulted in residents of the settlement to perform dirty and dangerous labor, such as waste management, in exchange for being able to buy smaller quantities of higher priced

and often contaminated water than what was available to residents of planned, formal housing.. Alongside two of the entrances to the colony were large piles of household rubbish, plastic containers, and scrap metal, which were actively being sorted and re-packaged by workers with their bare hands. These fifteen or so workers ranged in age from school-aged children to the elderly and included both male and female residents of the colony. Household waste management in Kathmandu continues to be provided by a large network of private, small-scale operators contracted to provide services to particular areas of the city (Interview 10/14/2017; Follow-up Interview 3/1/2019). Many waste collectors and rag pickers reside in informal settlements like the one where Ajay and his family lived, and many waste collectors first bring the rubbish to sorting areas like the one in Ajay's settlement to salvage any valuables from it before taking it to landfill (Interview 10/14/2017; Interview 11/18/2017).

Nearly all of the residents of the squatter settlement where Ajay lived participated in various areas of Kathmandu's informal urban economy, with sidewalk vendors, shoe cleaners, ear cleaners, rag pickers, and handymen represented among the residents I spoke with. None of the residents I interviewed there drew a monthly salary, and most were daily wage-laborers with highly variable and unpredictable incomes (Conversation 10/14/2017; Interviews 10/16-18/2017). Despite this, there existed notable levels of stratification within the settlement -two of the more well-established families working in waste collection and scrap metal recycling had new, higher-end large screen televisions in their homes, while other families lived in much more modest dwellings with few material belongings (Interviews 10/16-18 2017). In later

interviews with planners and engineers, I would come to hear the trope of “wealthy slum-dweller” as a critique that many residents of such settlements were essentially free-loaders who could afford to pay to support municipal services, but simply don’t want to (Conversation 1/31/2018; Interview 2/17/2018). In my own interviews with residents, I found no evidence to support such claims, although there did exist varying levels of security in accessing basic services like household water, food and electricity.

One of the larger dwellings in the settlement, a household headed by a waste collector named Suraj, had a 1000-liter water storage tank out front and a new flat-screen television in the larger of the two rooms, powered by a pirated connection to the Nepal Electricity Authority (NEA) grid. When I asked Suraj about his work, he replied; “this work is very dirty, it is difficult, the days are long, but if you work hard you can earn what you need)” (Interview 10/17/2017). Suraj told me how he had started working in waste collection as a twelve-year old boy, but that over the years he had managed to save a little bit of money and had recently taken a loan to buy a tractor and cart so that he could operate his own independent waste collection service with his two sons (Interview 10/17/2017). During good times, Suraj would take on one or two additional residents from the squatter colony to help collect and sort the waste on an ad hoc basis. Suraj’s wife, Sumitra, worked as a domestic helper for a family in a nearby upscale area. Most days she would wake up before dawn to cook rice for her family before walking to work where she would make breakfast and help her employer’s children get ready for school. With her two sons now grown, Sumitra

would leave her younger daughter under the supervision of an elderly “auntie” in the settlement while caring for the children of her employer (Interview 10/17/2017).

Although Sumitra’s own burden of household chores was reduced somewhat by being able to store water in a 1000 liter tank, for most families, water collection remained a major challenge. Of the many modalities through which Kathmandu Valley residents acquire household water, few of the most reliable options were available to residents of the squatter colony. Given the residents’ precarious land tenure status, not one household had access to a piped water connection, nor did most residents have the means to drill borewells for extracting groundwater (Interview 10/16/2017). Far from the historic centers of Kathmandu, Patan and Bhaktapur, there were no communal stone spouts (*dhara* or *hiti*) within walking distance of the settlements, and unlike some semi-urban areas of the valley, no community-managed water system. As in many neighborhoods of Kathmandu, private tanker deliveries comprised the lion’s share of the settlement’s water supply, but unlike in more affluent areas along the city’s periphery, most households here had very limited water storage capacity, forcing residents to rely on frequent small-scale deliveries of water that were far more expensive on a volumetric basis than what more affluent households were paying for larger, less frequent deliveries (Interviews 10/16; 10/17; 10/18, 2017).

After meeting Suraj and Sumitra’s family, I was introduced to another family of waste collectors whose lives were more heavily constrained by the drudgeries of collecting household water and the challenges of unpredictable income posed by intermittent, informal work (Interview 10/17/2017). Like Suraj, Ramesh had also supported his

family by working as a rag picker since his childhood, but unlike Suraj, Ramesh continued to scavenge for valuable waste on foot, carrying several large burlap sacks hunched over his back, as he went from neighborhood to neighborhood collecting plastic waste, glass, and more valuable scrap metals, whenever he could find it (Interview 10/17/2017; Interview 10/18/2017). Unlike Suraj, Ramesh had never received any formal contract or agreement to provide waste management services, and thus his income was much more heavily dependent on his ability to find items that he could re-sell to wholesale recyclers (Interview 10/18/2017). Ramesh expressed hope that he could one day also secure a loan to expand his business as Suraj had done, but he still held high-interest debt to a black-market moneylender who had given his family some money for construction materials after the 2015 earthquake (Interview 10/18/2017). The contrast between residents like Suraj, who was living in an unrecognized settlement, yet still had the means to engage in formal contracts, and his neighbors like Ramesh whose daily struggles remain disconnected from the privileges that such recognition can bring demonstrates how citizenship can be an incremental, intermittent and reversible process (Anand 2017). While all residents of this settlement also continue to rely on informal water services to meet household needs, the partial recognition of the labor of some residents, such as Suraj, enables them to invest further in household infrastructure, such as larger water tanks, allowing them to accrue full benefits of citizenship in a gradual and piecemeal fashion (Anand 2017; Ranganathan 2016). While newer arrivals like Ramesh were

striving to achieve similar contracts, the absence thereof led to greater household burdens for his closest of kin.

Ramesh's wife, Maya, spent much of her days performing simple household tasks and taking care of their five children, though she would also spend hours most days helping Ramesh and some of the other rag pickers in the settlement sort through their bundles, as the men would make multiple trips throughout the day hauling bundles of municipal waste in burlap sacks on their backs. Maya and Ramesh owned five, 20-liter jerry cans, which would need to be filled each morning to provide water for all seven members of the household for the day (Interview 10/18/2017). A tank supplying low-quality water from a nearby river, would park in front of the settlement each morning, and dozens of residents, mostly women, would queue up and wait to fill their jars and cans. Although this water was of much lower quality than what many tankers supplying wealthier neighborhoods had on offer, the small-scale of each resident's purchases meant they were often paying more than double the cost per liter as what wealthier residents with large storage facilities were paying for higher quality water (Interview 10/18/2017; Interview 1/23/2018). Moreover, the time burden of collecting water amounted to more than an hour every morning, with women in particular, needing to make multiple trips between their dwellings and where the tanker was parked to carry a single day's worth of household water.

The burden of water collection was indeed far more burdensome for many of the families living in the squatter settlement in comparison to the predominantly Newari families living in registered housing who relied on the ancient *hiti* to meet household



water needs. As mentioned earlier in this section, the families who rely on the *hiti* are also largely from working class backgrounds, but for these families there exists a free source of water right outside the door that is available 24 hours a day. In comparison, many of the families in the settlement where Ramesh and Maya, Ajay and Aarti lived were spending a substantial share of their income on water of poor quality, with Aarti and her children reporting that they often get rashes if they remain in contact with this water for long periods of time (Interview 10/16/2017). Beyond concerns of cost and quality, however, is the question of agency and the contrasting role that water collection plays for Aarti and Maya compared to the Newari respondents in Bhaktapur who view the stone steps surrounding the *hiti* as a longstanding community gathering space where old friends and acquaintances can gather and get caught up on the latest news and gossip while they go about their daily tasks (Interview 10/16/18 2017; Interview 5/20/2019). In contrast, the tanker queue where Aarti and Maya collect their water has no such inviting spaces to sit, chat, sip tea and relax with other women in the community in between work and household tasks. Most of the women in the squatter settlement also participated in the informal economy, with water collection tasks often reducing the ability to pursue work or additional sleep (Interview 10/18/2017). These challenges were shared by some, but not all, of the women collecting water from the *hiti* in Bhaktapur, though in the latter case most of the women spoke of the existence of the ancient *hiti* in their neighborhood as a source of cultural ingenuity and pride, whereas the families in the squatter settlement expressed no sentimentality toward having to queue up every

morning next to piles of rubbish to wait for over-priced tanker water whose delivery times were erratic and unreliable (Interview 10/16-18/2017; Interview 5/20/2019; Neupane 2015).

In contrast to the squatter settlement where I conducted interviews, and in other working-class areas, such as among the women at the *hiti* in Bhaktapur, the task of supplying household water was more frequently performed by men in some of the wealthier areas of the city. One respondent I met with frequently during the research suggested that while most domestic chores in Nepal are frequently gendered as women's work, tasks that involve operating machinery are often left to men (Interview 1/23/2018; Interview 1/28/2018). This held true among many of the households where I conducted interviews frequently throughout the course of this research. For instance, both Bhojraj and Karma – interviewed earlier in this chapter – always performed the work of operating pumps and other machinery themselves rather than leaving the task to anyone else in their household. Many wealthier households operate two electric pumps: one for extracting water from public supply lines when it is flowing, and another for pumping water from underground to rooftop storage tanks. In such households where I conducted interviews the tasks of operating pumps to extract water from municipal water lines was often performed by the male head of household (Interview 1/23/2018; Interview 1/28/2018; Participant Observation 9/2017-3/2019). In contrast, women were the primary water collectors in all of the households in the squatter settlement where Ajay invited me to conduct interviews. Similarly, during the interviews at the ancient *hiti* in Bhaktapur all of the

primary water collectors were women. In both of these latter cases, the female water collectors were responsible for carrying 20 liters or more of water at a time back to their homes, while the men I interviewed earlier in this chapter were merely responsible for flipping a switch to operate a pump, although several of them, too, needed to wake up in the middle of the night to perform water collection duties. In all of these previous examples, the interview respondents and research participants lived in densely populated urban neighborhoods, regardless of their financial status, gender, or level of recognition by government authorities. For residents living along the more rural, peri-urban periphery similar challenges persist, although the particular conditions of water access look somewhat different than in denser neighborhoods.

*Peri-urbanization and water practices beyond the scope of the historical urban core*

Areas of the Kathmandu Valley beyond the dense urban core are not slated to receive Melamchi water during the initial phases of the MWSP, and are likely to continue to rely on a variety of alternate modalities for accessing household water for the foreseeable future. In newly built, and often more sparsely populated, peri-urban areas groundwater extraction tends to play a larger role in households' water portfolios, although many residents in these areas also do rely on tanker deliveries, along with community-managed water systems and spring water where available. On the other hand, the scope of the piped, municipal water network does not reach many of the rapidly growing peri-urban areas of the Kathmandu Valley. While there are

plans to extend this network in coming years, along with plans to extend MWSP tunnels beyond the Melamchi Basin to bring additional water from the Larke and Yangri Rivers (tributaries in the Indrawati Basin), this supplemental water network is still at least several years away at the time of this writing. Thus for residents whose homes occupy peripheral geographic spaces along the rapidly urbanizing metropolis of the Kathmandu Valley, the challenges of accessing domestic water are likely to continue to persist long after many residents of dense core neighborhood reap the benefits of subsidized household Melamchi water.

(Figure 2.7 below depicts Kathmandu (blue), Lalitpur (green) and Bhaktapur (orange) districts with the urban municipalities highlighted by a red ring. The areas of each district that lie outside the red ring include mountainous rural and flatter, rapidly growing peri-urban spaces that lie beyond the scope of each city’s municipal services, yet remain economically and socially inter-connected with the urban core)



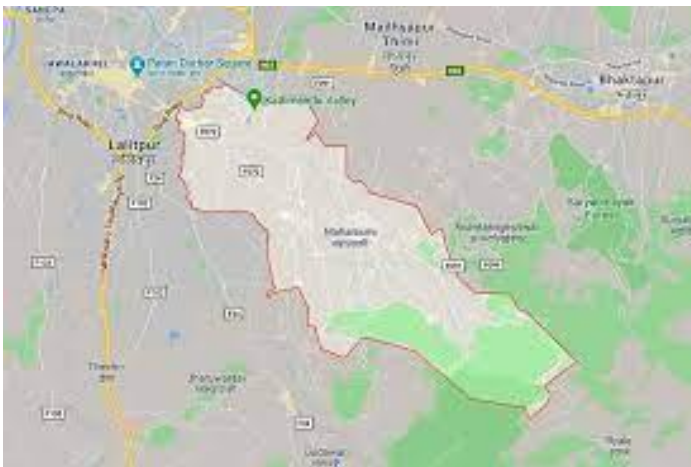
*(Figure 2.7: courtesy of Kathmandu Metropolitan City (KMC))*

The concept of peri-urban spaces and processes of peri-urbanization is well documented within the field of political ecology. For instance, Ranganathan and Balasz (2015: 404) use the concept of peri-urbanization as a “relational and political bounding of the fringe” rather than simply characterizing areas beyond the reach of municipal water infrastructure networks in descriptive terms such as rural or urban. Several studies on (peri)-urban water access in South Asia have affirmed how water is inextricably embedded with notions of place and the rights and privileges of citizenship (Anand 2015; Anand 2017; Ranganathan and Balasz 2015; Ranganathan 2016; Shrestha, Joshi and Roth 2020). For the purposes of the following analysis, I draw upon interviews and participant-observation in rapidly growing neighborhoods that lie beyond the scope of Kathmandu Upatayaka Khanepani Limited (KUKL’s) municipal water system and that fall outside the political administration of the three “metropolitan cities” of Kathmandu, Lalitpur and Bhaktapur, but within the administrative boundaries of these three districts. Over the past decade a number of the Kathmandu Valley’s erstwhile Village Development Committees (VDCs), the basic unit of rural governance in Nepal, have been consolidated into new municipalities in an effort to administer basic services to the rapidly growing population of these areas. The new municipalities, sometimes also referred to as ‘rural municipalities’ by government officials, provide a more limited array of public services than the “metropolitan city” cores of Kathmandu, Lalitpur and Bhaktapur, yet serve as nodes in a network between the metropolitan cities’ economies and

adjacent VDCs. Such spaces can be characterized by their proximity to KUKL's urban water network, yet exteriority to it, resulting in a longer-term need for investment in alternative modalities for household water access than in areas about to receive Melamchi water (Ranganathan and Balasz 2015; Shrestha, Joshi and Roth 2020).

Outside of the most densely populated urban neighborhoods, groundwater production, community water systems and spring water all play a larger role in supplying domestic, household water than they do in the city center. Many of the oldest settlements of the Kathmandu Valley were built on or near hilltops, and because of this, even wealthy residents of these neighborhoods like Bhojaj, Ismail, Karma and Trishna and Kumar were unable to rely on groundwater from privately dug borewells to meet their households' needs. Geography and biophysical factors play a major role in shaping and constraining the modalities of household water access for rich and poor residents alike across the widely variable topography of the Kathmandu Valley. Some of the fastest growing settlements in the valley in recent years have been in the valley's southern reaches in the newly created Mahalaxmi (Rural) Municipality of Lalitpur District, an administrative area that was first created in 2015 out of the merger of five older VDCs into a consolidated political unit (Mahalaxmi Municipality 2021). Because of variations in local geography and geology, Mahalaxmi has among the highest average annual precipitation rates of any built-up area in the Kathmandu Valley and a groundwater table that was very close to the surface until rapid population growth accelerated in the 21<sup>st</sup> century (Chinnaswamy and Shrestha 2019;

Ishtiaque, Shrestha and Chhetri 2017; Shrestha, Joshi and Roth 2020). For this reason, locally-sourced groundwater plays a much more prominent role in many households' water supply, with water quality directly shaping households' economic circumstances, as ethnographic evidence from the interviews in the section below suggests.



(Figure 2.8: Mahalaxmi Rural Municipality, Lalitpur District, located immediately southeast of Lalitpur City and roughly 15 km southeast of Kathmandu, served as the site for interviews with peri-urban water users)

On a warm, mostly sunny day during the transition from the dry season into the pre-monsoon period, Numa sat on the steps to the back door of her *bhatti*, a small neighborhood place where local laborers would come to eat light meals and snacks and drink *raksi* and *chhyang*, both forms of home brewed local alcohol made from rice and sometimes millet, depending on the season. On this particular day one of the regulars brought a couple of friends with him that had never visited Numa's *bhatti*

before. After one of the newcomers complimented the quality of Numa's home brewed drinks, Numa happily proclaimed, "it's because the water here is very clear and clean. I have never found another place in this valley that has such good water. It reminds me of the water from my home village" (Participant Observation 4/25/2018). Numa shared a common outdoor well with a few other nearby households and small businesses. The well was operated manually with a large bucket attached to a rope that Numa would use on a frequent basis. One day she asked me if I wouldn't mind fetching some water so she could start fermenting more millet, and I was surprised to learn that the water level was only a couple meters below the surface. Moreover the water from this particular well was clear and fresh tasting without any of the sediment or high levels of turbidity I had seen at other wells elsewhere in the Kathmandu Valley. Existing studies on groundwater conditions in the Kathmandu Valley suggest that while water in a deep, impermeable aquifer is of generally high quality, water in the shallow aquifer layer is of highly variable quality with both clean and contaminated water produced from wells and testing sites only a kilometer or two apart (Shrestha, Semkuyu and Pandey 2016; Shrestha, Kafle and Pandey 2017). On that particular day, Numa's customers enjoyed their drinks while I had my fill of fresh clean well water without any notable negative effects. Numa did a brisk business.

Just as access to high quality well water can enable economic growth and prosperity, so too can erratic water quality lead to financial misfortune and hardship. Across the Kathmandu Valley, in another peri-urban area to the north of the city center, a friend and his neighbors were showing me the impacts from a groundwater well that had



recently deteriorated in quality. Unlike Numa's community well in Mahalaxmi Municipality to the south, this well was operated with an electric pump, which was bringing up water that alternated between brown and a dark golden shade of yellow in hue with high levels of turbidity. Two of the residents of a nearby house mentioned that the water from this well had been clear until recently, but now had high levels of sediment and a chemical smell that wasn't there before (Interview 9/4/2018). The well was in between two houses, some paddy fields, a fruit and vegetable garden, and a construction site where the sound of drills and jackhammers drowned out the conversation at times. "Since they started building over there" motioned one of the area residents toward the construction site "the water is sometimes brown, but other times clear" (Interview 9/4/2018). I picked up a bucket of the well water, ran it through my fingers and noticed a faint whiff of what appeared to be either petroleum or motor oil. "This water is okay for washing the floor or laundry, but my skin turns red if I try to shower with it when it is brown like this" the resident continued (Interview 9/4/2018). On the ground near the construction site, I noticed what appeared to be shiny fluid running over the dirt not far from the well. "These days I now must buy water from the tankers... I bought this house just a few years ago because of the well facility ... and now the water has become dirty" (Interview 9/4/2018).

Given the wide variability in the quality of water from the shallow aquifer across relatively short spans of space and time, the reliance of residents on such well water for household needs can be precarious, even though wells often do provide a more

reliable, less time-consuming supply of water than the municipal network sometimes does. Moreover, the current rate of groundwater production in the Kathmandu Valley far exceeds the rate of recharge, while the rapid, and largely unplanned, covering of land with new buildings and urban infrastructure sharply curtails the number of potential sites for future aquifer recharge (Lamichhane and Shakya 2019; Lamichhane and Shakya 2020). Despite this there is hope that the arrival of Melamchi water will relieve some of the stress on the shallow aquifer, while allowing some groundwater to recharge by adding supplemental water to river and stream beds. Nonetheless, such efforts will take conscious planning and the creation of groundwater recharge areas in order for residents like Numa and her neighbors in peri-urban areas to continue to have access to sufficient qualities and quantities of locally-sourced water (Dahal, Khanal and Mishra 2019; Lamichhane and Shakya 2019). For the growing number of Kathmandu Valley residents who live outside the service area of the initial phase of Melamchi water supply, the need to manage this supplemental, imported water in a way that produces co-benefits for peri-urban areas will be instrumental to the long-term health of the aquifer and to residents' household water security.

Figure 2.9 (below)

Laundry hangs to dry around a hand-operated, communal well in a peri-urban neighborhood of the Kathmandu Valley (Photo taken by author with permission from neighborhood residents)



*(Figure 2.9: Community-managed wells and water systems serve as an alternative to private or public systems for peri-urban residents)*

Back in Mahalaxmi Municipality communal wells are but one modality commonly employed by peri-urban residents to access household water. Although this part of the Kathmandu Valley has remained rural and predominantly agricultural throughout most of the valley's history, over the past decade many relatively affluent and educated professionals have bought land and built houses here, drawn by the proximity to the city without the congestion and noise of the denser urban

neighborhoods. Although drilling an individual household well can be cost-prohibitive for most residents, in recent years many newcomers to the area have pooled their resources together to build community-managed water infrastructure that affords more convenience and protection from the elements than a communal well at a lower cost than drilling an individual household well (Interview 3/2/2019; Interview 4/7/2019). These water systems are especially common closer to the steep slopes of the foothills where spring water is more abundant. One spring-fed stream, the Godavari Khola, for instance, drops down from foothills to the south and roughly bisects Mahalaxmi Municipality into two halves as it flows northward, gradually reducing in speed and gaining in sediment load and pollution as it flows through more densely populated areas. Settlements near the foothills have pooled their resources, in many places, to build systems of small PVC pipes connecting springs and streams from places like Godavari where clean water is more abundant to neighborhoods that are located further downstream.

Nepal has a long history of community-managed water infrastructure that is built and maintained by local-level participants rather than state and government actors or private companies, which has often been touted as providing a more effective alternative to state and market-driven strategies (Ostrom and Varughese 1990; Shrestha, Joshi and Roth 2020). In less populous rural areas some of these water systems, such as farmer managed irrigation systems (FMIS), have endured for centuries and remain an integral part of agricultural livelihoods in many parts of the country (Joshi, Ostrom and Shivakoti 2000; Thapa et, al 2016).In rapidly growing

peri-urban areas a number of community-managed water systems have emerged more recently to serve neighborhoods beyond the reach of the municipal, government-managed network and reduce reliance on private informal water markets, such as tanker truck deliveries (Interview 3/2/2019). In one such neighborhood in Mahalaxmi Municipality, a resident of roughly ten years told me, “I built a house here when I learned that the local drinking water committee was developing a plan to provide private connections to households in this area. The fee wasn’t too high for me, so I bought in” (Interview 3/2/2019). For many new arrivals who can afford it, the costs associated with joining and paying fees to a drinking water users committee is an attractive alternative to the higher costs of drilling a private borewell, or the prospect of living in a denser urban neighborhood and relying on municipal supply that many residents view as unreliable (Interview 3/2/2019; Interview 4/7/2019). In such instances, residents build a sense of identity and community through the payment of fees to a community-level organization rather than to private or government-managed entity, complicating notions of hydraulic citizenship that are predicated upon ever-evolving relationships between citizens and the state (Anand 2017; Ranganathan 2016). Though such community-managed drinking water users’ committees can provide a more reliable source of household water for committee participants, they can also exacerbate water conflicts and lead to exclusions of longstanding residents. Though the limited number of residents that rely on community-managed water systems that I had a chance to interview personally spoke favorably about the benefits of such systems, there are numerous examples of more in-depth case studies where

the building of such infrastructure has exacerbated inequalities, in some cases depriving long-time residents of their traditional sources of water (He and Lai 2018; Molden, Khanal and Pradhan 2020; Shrestha, Joshi and Roth 2020). One of the challenges in peri-urban Kathmandu associated with the building of such systems is the demographic divide between small-holding farmers, many of whose families have been tilling the lands for centuries, and relatively affluent newcomers, many of whom work in professional jobs in the urban core but prefer to live in less densely populated neighborhoods along the urban fringe (Interview 3/2/2019; Interview 4/7/2019). The limited number of respondents I spoke with personally assured me that there were no conflicts between their community-managed system of spring water and other categories of water users, and that they had personally achieved certification from municipal officials that there were no competing claims from prior users before construction began (Interview 3/2/2019; Interview 4/7/2019). Nonetheless, Shrestha, Joshi and Roth's (2020) study of another community-managed, peri-urban water system only ten kilometers from where I conducted these interviews revealed that a drinking water and sanitation committee set up by high-caste settlers to the area ultimately undermined the flow of spring water from a stone tap that had supplied clean water to a marginal *dalit* farming community for centuries. Given the limited level of access I had to the community where I conducted these interviews, subsequent follow-up work could illuminate further the extent to which community-managed water systems elsewhere in peri-urban Kathmandu present negative impacts on the water supply of more marginal communities. Preliminary findings from this

work do show that such community-managed systems remain popular among the users of such systems, with fewer complaints or dissatisfaction than residents who rely on municipal or private water deliveries express.

*Where peri-urban meets rural: the enduring value of spring water*

Further up along the hillsides from where most of my interviews were conducted, spring water sources are more abundant and continue to provide a clean source of household water to residents of these areas. Fewer urban professionals have settled in this region than in peri-urban areas closer to the city center and a larger share of the residents living on the hilly edges of the valley are people of Newari heritage whose ancestors have been there for centuries. On a bright November afternoon just before the festival of Tihar, better known by its Hindi name of Diwali, Yogesh and his family are seated outside of their home while the sound of burbling, bubbling water can be heard flowing continuously in the background. “The water here is very good, and it flows well all year round” Yogesh proclaims proudly (Interview 11/4/2018). Next to where we are seated is a thin, black PVC pipe with water flowing constantly out of the pipe, across the soil and down the hillside. I ask Yogesh if I can see where the water comes from. “The water here comes from a spring in the jungle” Yogesh replies, gesturing toward a lush, verdant patch of forest on the opposite side of a slope covered in the bright orange glow of blooming marigolds, which are about to be harvested for the upcoming festival (Interview 11/4/2018). After a ten-minute walk along the hillside, we enter the thick canopy of trees and continue following the black PVC pipe until it emerges from behind a thick series of rocks. “Here is the spring that

supplies water to our house”, says Yogesh, “it is very good quality because it comes up from inside the rock” (Interview 11/4/2018).

Unlike in the more densely settled peri-urban areas below, Yogesh and his immediate neighbors each source their own household water independently of one another, owing to their location on a hillside with many small springs. Although residents of some rural hamlets not far from Kathmandu have experienced hardship since the 2015 earthquake led to disruptions in the flow of spring water, the impact of the earthquake on such water sources varies greatly from place to place with many sources continuing to supply clean water throughout the year. Yogesh is a medium-sized landholder with several small terraced plots of grains and produce between his house and the nearest neighbors. Like Yogesh, both the nearest house and an array of small businesses along a road on a nearby ridge have ample quantities of clean spring water available running 24 hours a day through a series of small PVC pipes. Even though the monsoon season is now well over, having not rained in more than three weeks, there are streaks of lush grasses growing along the hillsides where the spring water from the PVC pipes flows continuously down the slope. Such scenes are becoming increasingly rare in the more rapidly growing peri-urban neighborhoods closer to the valley floor, but can still be found further up the hillsides of the bowl shaped valley in many places, providing ample water for small plots of food in places where spring water is still available (Interview 11/4/2018; Interview 4/7/2019).

Back on the valley floor Numa takes the short walk from the back steps of her *bhatti*, or neighborhood hang out, to collect more water for cooking food for her customers. I



ask her how often she makes trips to the well, but she merely smiles and tells me she has no idea: “I’m just lucky I have clean water outside my door whenever I need it. I could never run this place and make money if I needed to buy tanker water” (Interview 5/25/2018). As Numa cooks, an intense pre-monsoon thunderstorm rolls through the area and I shift further inside to avoid a strong wind blowing the rain horizontally into the restaurant through the open side wall. Numa smiles and nods, mentioning “it’s very good to have this rain. It will be good for the paddy my brother is growing. The [paddy] transplanted will be good next month if this continues” (Interview 5/25/2018). Even though Numa’s *bhatti* is adjacent to several newly built upscale houses inhabited by professionals, many parallels exist between her neighborhood and other peri-urban sites in the Kathmandu Valley which are administratively urban, but where rural socio-cultural norms, institutions and practices still prevail in many places (Shrestha, Joshi and Roth 2020). The production of marginality and inequalities occurs relationally in such spaces rather than being characteristic of the more urban or more rural attributes of the residents who inhabit these peri-urban locales (Anand 2017; Ranganathan and Balasz 2015; Shrestha, Joshi and Roth 2020). Factors such as access to a productive well or spring water, security of land tenure and relationships with neighbors are every bit as integral to the well-being and prosperity of inhabitants of such spaces as any formal job title or qualifier commonly associated with ‘urban’ or ‘rural’ livelihoods.

In contrast to Numa, who has lived at her current location in Mahalaxmi Municipality for much longer than Mahalaxmi has existed as an administrative entity, many of the

new arrivals building houses nearby do buy tanker water to meet some of their household needs. Other households in the area pay to drill new borewells, either for individual household consumption or to share with neighbors (Interview 5/23/2018; Interview 5/25/2018). Although areas of new housing closer to the foothills more often pay to build community-managed water systems, the area where Numa's *bhatti* is located is far enough away from such sources of spring water to make such systems less feasible. Irrespective of household financial status, the residents of the peri-urban neighborhood where Numa lives fall a couple kilometers, or slightly more, beyond the boundaries of the piped municipal water system. Although there are longer-term plans to extend the MWSP tunnels to adjacent river basins beyond Melamchi, there were no definitive plans by any government authorities, at the time of research, to extend the municipal water network into the rapidly growing neighborhood where Numa lives. For the time being, Numa and the neighbors with whom she shares a well are grateful they have a clean and reliable supply of water that enables them to pursue their livelihoods and run households and a business without significant restrictions. In the longer-term, however, continued population growth without further extension of municipal supply, or regulations on wells and groundwater extraction, is likely to place increased stress on the aquifer upon which Numa and her neighbors have relied for decades. Though the availability of extra water from inter-basin transfers carries the potential to relieve pressure on the Kathmandu Valley's groundwater basin through reduced demand for groundwater in the urban core, ensuring the long-term health and viability of the aquifer will require additional

targeted policy interventions, including designated recharge zones and more coordinated planning to reduce groundwater contamination and flooding from excess surface run-off (Chinnasawmy and Shrestha 2019; Lamichhane and Shakya 2019).

The conversion of agricultural land into urban housing development across peri-urban areas of the Kathmandu Valley, like the rapidly growing neighborhood where Numa lives, has drastically reduced the capacity for groundwater recharge into the aquifer underlying the valley (Lamichhane and Shakya 2019). Even before the rapid urbanization of the Kathmandu Valley, groundwater recharge into the Valley's deep aquifer was heavily constrained by impermeable and semi-permeable clay layers in many places (Ishtiaque et, al 2017; Lamichhane and Shakya 2019). For instance, much of the western and southeastern portions of the Kathmandu Valley's groundwater basin experience very low rates of groundwater recharge due to the hydrogeologic characteristics of the aquifer in those areas (Lamichhane and Shakya 2019). Many of the areas in the Valley that have historically experienced the highest rates of groundwater recharge are contiguous with areas that are now experiencing some of the highest rates of unmanaged urbanization, including areas just south and east of the metropolitan cores, such as Mahalaxmi Municipality, Kirtipur and Madhyapur Thimi (Coversation 3/24/2018; Lamichhane and Shakya 2019).

Lamichhane and Shakya's (2019:13) model on future groundwater recharge suggests that the areas that are most likely to experience decreased rates of recharge over the period 2020-2050 are contiguous with the concentric circles around current and

proposed future ring roads where the most rapid rates of unplanned urbanization are occurring.



*(Figure 2.10: The blue ring depicts the existing ring road completed in the 1970s, while the red ring depicts the proposed outer ring road. Areas concentric with the blue ring are experiencing some of the sharpest drops in groundwater levels – see Ishtiaque, Shrestha and Chhetri (2017) for Landsat images of growth)*

Many challenges associated with groundwater contamination and overdraft resulting from the rapid growth of peri-urban neighborhoods are likely to continue in the immediate future, given a heavier focus on motor vehicle-centered development in recent years. One early catalyst for the expansion of Kathmandu’s built-up area into erstwhile forests and farmland was the completion of a ring road in the 1970s, along which rapid, unplanned urbanization and groundwater overdraft occurred (Interview 3/3/2018; Lamichhane and Shakya 2019). Today all of the neighborhoods inside of the Kathmandu Valley’s ring road constitute core urban neighborhoods served by KUKL’s municipal water supply. Ishtiaque, Shrestha and Chhetri (2017) compare landsat images from 1989, 1999, 2009 and 2016 respectively to demonstrate how the urban area grew by 412% in less than three decades, while more than 30% of all agricultural land across the valley was converted into built-up areas. Growth rates

have been especially high along the urban fringe, with peri-urban communities such as Kirtipur, and Madhyapur Thimi experiencing growth rates of more than 5% per annum over the course of the study period. These areas of rapid, unplanned urban growth are highly correlated with areas experiencing the greatest loss in groundwater recharge, adversely affecting agriculture and domestic users alike (Lamichhane and Shakya 2019). Since the start of the 21<sup>st</sup> century, the most rapid, unplanned growth has occurred along newly widened roads, and along the new Kathmandu-Bhaktapur highway, which underwent large-scale expansion in the 2000s with assistance from international donors. These areas, in particular, have experienced high rates of groundwater overdraft and reduced recharge rates due to rapid land-use and land-cover change (Ishtiaque et. al 2017; Lamichhane and Shakya 2019). Though many residents of rapidly growing peri-urban neighborhoods, such as Numa, are still able to rely on relatively clean groundwater to support their households and businesses, a growing number of wells like the ones Numa shares with her neighbors are experiencing deteriorating water quality and dropping water levels – a trend that is likely to accelerate in the absence of policies actively promoting aquifer recharge. Many of the development-oriented strategies promoted by foreign governmental agencies in Kathmandu over the past few decades have promoted urban sprawl by prioritizing road widening over investments in public transportation and pedestrian infrastructure, helping to accelerate environmental degradation in peri-urban neighborhoods and reducing groundwater recharge and natural drainage (Interview 2/18/2018; Interview 3/3/2018). These trends have continued over the most recent

decade, with many of the largest public infrastructure projects completed in the Valley in recent years being road widening and expansion projects with much more limited investment in facilities for pedestrians, bicycles and public transportation infrastructure. Indeed, while micro-buses and passenger buses are plentiful along major thoroughfares in the urban core, these routes are run almost exclusively by private owners and operators that effectively function as a cartel, with limited evening and no nighttime service and no accommodations for elderly passengers or those with physical disabilities. Efforts to introduce municipal-run transportation services have been very limited in scope and mostly unsuccessful (Kathmandu Post 4/3/2018; Ojha 2018) Given the challenges that Nepal's infrastructure poses to the well-being of many of its citizens, there appears to be widespread consensus on the need to improve access to basic goods and services by updating the country's transportation networks (Interview 2/18/2018; Interview 2/21/2018; Interview 3/3/2018). Nonetheless, several engineers and planning students I interviewed expressed concern about the lack of government investment in accessible bus networks, pedestrian safety features, and facilities for non-motorized vehicles in many recent urban transportation projects (Interview 2/21/2018; Interview 3/3/2018; Kathmandu Post 12/22/2018).

The completion of a 9.5 kilometer ring road expansion project in 2018 – a cooperative effort between the federal Government of Nepal and the China's overseas development agency– took the entire length of the ring road to eight lanes, increasing motor vehicle capacity, but also drawing criticism for a lack of pedestrian crossings as part of the original project design (Interview 1/29/2018; Kathmandu Post

12/22/2018). This expansion greatly increased traffic speeds, bisecting neighborhoods that previously had close knit social ties between residents living on one side of the roadway, and schools and businesses on the other side. The widening of sections of roadways like this one encourages citizens with private vehicles to settle further from core urban areas where most of the jobs are located. This is one of the reasons that there has been an influx of more affluent professionals settling in peri-urban areas like Mahalaxmi in recent years. Moreover, many of the failings over how some of this new infrastructure has been built and implemented is also directly linked with deteriorating water quality in neighborhoods along the urban fringe. For instance, one bridge over the ring road near Sitapaila and Kalanki was built in a way that inhibits the flow of sewage from a discharge pipe, causing large quantities of wastewater to pool and leading to sporadic monsoon flooding in adjacent low-lying neighborhoods (Interview 1/29/2018; Interview 3/3/2018; Nepal Rising 2018). Many other low-lying wetlands along the ring road have also been filled in with concrete in recent years, exacerbating seasonal flooding in adjacent neighborhoods and reducing rates of groundwater recharge into the shallow aquifer upon which so many peri-urban residents rely (Interview 3/3/2018; Lamichhane and Shakya 2019). While improving and upgrading roads and highways enjoys widespread popular support as a central tenet of Nepal's development, the implementation of many large-scale infrastructure projects is frequently contested, often over concerns of how the benefits of such projects will be shared.

Highway infrastructure has also been proposed as a potential solution to remedy contamination from urban wastewater, drawing mixed reactions from locals asked about such projects. For instance, JICA has proposed constructing a new inner-ring road to alleviate traffic congestion that could be built by covering the heavily polluted Dhobi Khola stream with concrete, clearing squatter settlements along the banks, and building a new six-lane highway over the waterway. This proposal has yet to be approved as of the time of writing, but public pressure to improve traffic conditions, along with water access, ranks high among matters of top public concern for Kathmandu denizens, even when such initiatives carry heavy social consequences (Khanal, Gurung and Chand 2017). This is especially true when long-time residents are dispossessed, such as the ancient Newari village of Khokana, which was cleared to make way for several overlapping infrastructure projects attracting significant attention from Nepalese scholars in recent years (Pradhan 2018; Timisina et. Al 2020; Upadhyaya and Pelling 2020).

Although protests over the dispossession of ancient indigenous settlements have garnered significant media and scholarly attention in recent years (Pradhan 2018; Timisina et. al 2020; Upadhyaya and Pelling 2020), most of the residents of peri-urban neighborhoods of the Kathmandu Valley with whom I became the most closely acquainted spoke about a lack of such large projects in the particular areas where they lived (Interview 4/18/2018; Interview 5/23/2018; Interview 5/27/2018). Some residents of these neighborhoods like Numa were satisfied with their access to relatively clean well water, which they perceived as being superior in quality to the



less reliable, and often dirty, water supplied to residents of core urban neighborhoods through the piped municipal network (Interview 4/18/2018; Interview 5/23/2018). In other cases, residents expressed concerns that groundwater from local wells had deteriorated sharply in quality in recent years, such as the research participants whose well water had become dark in color and high in turbidity, causing a rash to some members of the household (Interview 9/4/2018). Even instances where neighbors shared the same well, their perceptions of the task of water collection was often sharply different. For example, one of Numa's neighbors with whom she shared the communal well, and who lived a little further away, would often complain of the pain of making frequent trips to carry water, while Numa whose home was situated slightly closer to the water source spoke exclusively in positive terms about the benefits that having a clean, reliable water supply brought to her business – something she said she never could have done as successfully had she lived somewhere with less reliable water supply (Interview 5/23/2018; Interview 5/27/2018).

*Restoring ancient infrastructure recharges groundwater on which peri-urban residents rely*



*(Figure 2.11 (above): The restoration of this ancient reservoir replenished nearby peri-urban wells, photo courtesy Maya Gurung)*

Another one of Numa's neighbors, Phung, with whom Numa had shared the communal well for several years, moved from Mahalaxmi Municipality to Madhyapur Thimi, another rapidly growing peri-urban municipality, during the course of this research to have more living space for her growing family. During the last months of this fieldwork I visited Phung and her husband, Muk, with a friend to see the new house where they lived with their two young children. Phung and Muk's new house, like their old one, was adjacent to an open field on one side, some newly built houses on another, with a community well also serving their house and several others nearby. Phung mentioned that she paid 80 rupees a month (a little under \$1) to access water from this well, with the fee collected by a longer-time resident of the neighborhood (Interview 6/15/2019). The well was a little bit further from their new house than the old one that Phung and Muk shared with Numa was, but the water was also clear and available whenever needed. After a while, Phung's new neighbor, Tista, sat and joined us for lunch. Tista, a long-time resident of the neighborhood, mentioned that the water in the well previously had been declining for many consecutive years, but that the water level had begun to recover just two years earlier after local authorities began restoring an ancient pond and reservoir nearby that had been neglected for many years (Interview 6/15/2019). Though the interview at this particular well marked the only case from the nearly three years of fieldwork where a well user spoke of rising groundwater levels and improving water conditions, it does

provide a glimmer of hope that water conditions in the Kathmandu Valley can improve with the right combination of policies and social conditions.

Although Madhyapur Thimi has been experiencing one of the fastest rates of population growth of any settlement in the Kathmandu Valley during the 21<sup>st</sup> century, it was also home to an ancient system of ponds and reservoirs that date back as far as the ancient Kirati era. Many of these ponds dried up in the second half of the 20<sup>th</sup> century, after decades of neglect, but recent efforts to restore the ponds to their older condition have had the unexpected (to Tista and her neighbors, at least) benefit of halting many years of declines in local groundwater levels and improving the quality of water in many nearby wells – something of critical importance to residents in a neighborhood where community wells are a primary source of household water (Interview 6/15/2019; Interview 6/19/2019). Bajracharya et. al's (2020) analysis of inter-connections between surface-water and groundwater in the Kathmandu Valley basin also indicates that there exists strong inter-connections between local surface-water sources and the shallow aquifer, yielding strong potential for aquifer recharge through restoration projects, but also the potential for further contamination if sources of pollution aren't managed more effectively. The import of inter-basin water from the MWSP thus carries several potential co-benefits for groundwater levels in the Kathmandu Valley basin, but any potential positive impacts on the shallow aquifer will require conjunctive management techniques to reduce the amount of surface runoff and ensure the continued functioning of the valley's own indigenous water systems and technologies.

Back in Mahalaxmi Municipality, more of the affluent newcomers to the neighborhood are relying on tanker deliveries rather than the communal wells used by residents like Numa and Phung. Though some of the newer residents in the area have shelled out big money to drill private borewells, many others are worried about whether long-term groundwater levels and quality will make the investment worth its while (Interview 5/25/2018; Interview 6/1/2018). While the groundwater from the communal well that Numa shares with her neighbors is still relatively free of (microbial) contamination, a nearby surface water stream a few blocks away has become heavily polluted with sewage in recent years due to rapid population growth. Longtime residents of the area mention swimming, bathing and washing laundry in the stream as recently as 20 years ago, but these days it's only stray dogs that set foot in the stream (Interview 5/23/2018; Interview 5/25/2018). On the opposite bank of the stream from Numa's *bhatti* lies a large, open flat and muddy plain with a single older house built on it. Beyond the flat and muddy bank a number of new, upscale concrete houses line a small grid of lanes slightly uphill from the older house, with several of the more upscale houses still under construction. The older house is surrounded by vegetable gardens and a chicken coop, while many of the newer houses slightly uphill have gated courtyards out front. An assortment of water jars and tanks of various shapes and sizes sit, mostly empty, in front of the older house, while a pair of deep tire tracks stand out against the mud. Despite the older house's modest appearance, its occupants are well-known and respected within the community, having lived there

longer than most of their neighbors and serving the community with fresh eggs, water and home brewed alcohol.

Unlike Numa's *bhatti*, or neighborhood hang-out, a short distance away across a bridge on the other side of the stream, Sita and Ram's house does not have a lot of extra tables or chairs for members of the neighborhood to sit and congregate. Despite this, in a typical afternoon or evening hour at Sita and Ram's house, a dozen or so neighbors will drop in to pick up eggs, meat, and homemade drinks. Sita tells me that she and Ram bought the land where their house is located right after they were married nearly thirty years ago and built the house in the traditional style of wooden farmhouses from their native village in Ilam District in the east of Nepal (Interview 6/1/2018). Although the house looks like it is made entirely from wood, it is, in fact, re-enforced by cinder blocks, yet serves as a striking juxtaposition to many of the still unfinished concrete houses being built nearby, many of which are decorated with elaborate ornamental features. Unlike the newer houses, which occupy most of the smaller sub-divided lots on which they are still being built, Sita and Ram have plenty of space surrounding their house to grow vegetables, maintain a chicken coop and for Ram to park his tanker truck, which he drives from well before dawn until dusk six days a week, supplying water to households all across the area. Although the nearby stream floods beyond its banks periodically during the monsoon months, the entrance to Sita and Ram's house itself is elevated enough to avoid the worst of the floods, while the soil surrounding the house is nutrient rich, making theirs one of the most productive vegetable gardens in the area.

During one of the first of many visits to Sita and Ram's house I asked them about where they sourced their household water. Ram merely laughed and pointed to his truck. He then told me, "when we first moved here when we were younger, we used that stream over there for many things" (Interview 6/1/2018). Back in those days the area that is now administered as Mahalaxmi Municipality was a collection of several smaller villages and nearly all of the residents were engaged in agricultural labor. I then asked Ram when and how he bought the tanker truck parked on the muddy floodplain in front of their house. "We used to grow paddy and wheat over there" Ram responded, gesturing to a nearby area where a couple larger concrete houses now stood (Interview 6/1/2018). "This is not our ancestral land, but this area was very affordable when we first came here 30 years ago. Since then this land has become very expensive, so we sold some ten years ago and I bought this truck" (Interview 6/1/2018). As we talked, Ram and Sita's high school aged son walked by in his school uniform, waved at us, and passed into the house. After we ate some food and chatted bit, I proceeded to ask Ram whether he thought working in water supply like he does would be a good job for a younger person who is coming of age right now. Ram replied, "I want my son to go to university and be successful. For me, driving the truck is a good job, because I was able to buy the truck after selling some land, so I don't have any debt", He then continued, "I don't earn much money selling water, but I have good arable land, some chickens, and an original house. The original house in a new neighborhood. I have all I need" (Interview 6/1/2018).

Existing scholarship on processes of urbanization and peri-urban spaces in South Asia often emphasizes how factors such as security of land tenure, social relationships within the community and access to the means of producing sustenance are often every bit as integral, if not more so, to social status as monthly income or formal employment (Narain and Prakash 2016; Ranganathan 2016). Ram and Sita's level of recognition within their neighborhood, their ability to provide neighbors with household water deliveries, fresh eggs and produce, and homemade alcohol on short notice, combined with the fact that they held the title to prime real estate afforded them a level of security and respect within their community that could not be reduced to simple financial metrics based on income or occupational status alone. Indeed many of the new arrivals with professional jobs and spacious new concrete houses experienced more precarious struggles to meet their household needs, given the fact that many such newcomers financed their new homes with massive amounts of debt and then still needed to rely on regular water deliveries and private transportation to go about their daily routines (Interview 6/1/2018; Interview 6/5/2018; Interview 2/28/2019). Ranganathan and Balasz (2015: 408) characterize investment and real estate speculation in such peri-urban spaces as productive of heterogeneous social transformations that utterly disrupt commonly held assumptions about core-periphery and urban-rural relations. Although the rapid influx of higher-income earning professionals in places like Mahalaxmi Municipality has placed additional stresses on the local groundwater basin and prompted some backlash in places like the ancient Newari settlement of Khokana, this influx has also transformed the lives of many

long-time holders of land too small to gain increased status through farming alone , but large enough to benefit from the rapid changes in land-use patterns (Interview 6/1/2018; Interview 6/5/2018; Pradhan 2018; Timisina et. al 2020). These changes have proven less beneficial, however, to the fraction of long-time residents who have never held secure land tenure in the first place, such as long-time squatter communities, or the *dalits* of Lamatar whose traditional water spouts were disrupted by a new community-managed water system from which they were excluded (Shrestha, Joshi and Roth 2020)

The area of Mahalaxmi Municipality where I conducted interviews with Numa, Sita and Ram was too far from any springs to make a community-managed water system viable, leaving wells and tanker deliveries as the two primary modalities for household water supply. As mentioned earlier in this section, fewer of the newer arrivals to the neighborhood relied on communal wells compared with long-time residents. Though some of the newcomers did pay to drill private borewells, the cost of private well construction combined with many residents' concerns over the potential of falling groundwater levels and contamination made this a less common option. Thus many such residents relied on tanker truck deliveries, of which Ram was a major supplier. After spending time in the neighborhood and becoming better acquainted with many of the residents I inquired whether I could join Ram on some of his water deliveries. He happily obliged and also offered to introduce me to other tanker truck drivers. In recent work on household water access in Patan, Molden, Khanal and Pradhan (2020) argue that water policy and development efforts ought to



look beyond the piped grid to enhance water security and fulfill residents' right to water. In the final section of this chapter, I draw upon findings from participant-observation and interviews with tanker truck drivers and water vendors to make the case that further support of existing, small-scale water purveyors and household-level installations can provide additional layers of water security and income generating opportunities if better coordinated across scales and over time with the conjunctive management of supplemental water from initiatives like the MWSP.

*Informal water economies, labor, and household water security*

A significant body of scholarship and literature from international lending organization touts the benefits of shifts from informal to formal supplies of household water, with many pieces of social scientific work, in particular, praising the positive impacts such a shift will hold on equity concerns for the urban poor (ADB 2008; ADB 2020; Prakash and Molden 2020; Thapa et. al 2018 Umdale et. al 2016; World Bank 2020). Given that the amount of household water currently supplied by KUKL, the municipal purveyor for core urban neighborhoods in the Kathmandu Valley, remains less on average than the 50 liters per capita per day recommended by the World Health Organization (WHO) to support optimal public health, the immediate benefits of augmenting municipal supply for Kathmandu residents are clear, and relatively uncontroversial among locals (ADB 2020; KUKL 2019; WHO 2020). Beyond unequivocal public health and economic benefits from making affordable

household water more easily available to Kathmandu residents, especially the urban poor, the import of supplemental water carries the potential to play a significant role in revitalizing biologically dead zones of local waterways and recharging the shallow groundwater aquifer, if locally-appropriate conjunctive management strategies are adopted. The recent rise in groundwater levels in Phung and Muk's community well after the restoration of an ancient reservoir pond near their new home in Madhyapur Thimi and findings from recent hydro-geologic studies both indicate that the import of supplemental water to the Kathmandu Valley can bring potential benefits even beyond the scope of the piped municipal network, provided that policies are implemented that are attentive to the inter-connections between different sources of water (Bajracharya et. al 2020; Interview 6/15/2019). Nonetheless, given the level of non-governmental and private household investment in water supply infrastructure across the Kathmandu Valley, it is unlikely that household reliance on private, informal and community-managed supplies of water will evaporate in the near future (Gurung et. al 2017).

Earlier scholarship on tanker truck deliveries in urban areas of South Asia has sometimes painted reliance on such supplies in starkly dystopian terms, even characterizing them as water mafia, or at the very least, inequitable and unsustainable (Davis 2004; Truelove 2011). Indeed many aspects of tanker water delivery in the present day do run counter to many governments' putative goals of reducing carbon emissions over the longer-term and countering the unregulated extraction and contamination of groundwater and surface water sources. Nonetheless, the water

supplied by tanker trucks, along with water supplied by other informal and private vendors, fills a critical need for residents of the urban core and peri-urban areas alike, while employment in these informal water sectors supports thousands of people across the Kathmandu Valley. At the time of this research, municipally supplied water by KUKL comprised only 25-35% of total household consumption, depending on the time of year, of households located within the municipal utility's service area (ADB 2020; Umdale et. al 2016). Over a million and growing residents live beyond the municipal service area, most of whom rely either on locally sourced groundwater from shallow aquifer wells or on tanker deliveries to meet their household needs. Demand for tanker water varies throughout the year, with tanker deliveries higher in the dry season and lower during the monsoon (Dongol et. al 2012; Umdale et. al 2016). Moreover, a number of smaller, informal water vendors buy water in bulk from tanker trucks and then re-sell it to households in smaller quantities for a profit. These water vendors fill a critical niche in meeting the household water security needs of hundreds of thousands of households in the Kathmandu Valley alone. Unlike municipal water sources, tanker water deliveries are available any day of the week and can usually be arranged on relatively short notice. Below is a photo of one of the several hundred of tanker trucks in Kathmandu – a source of livelihood for thousands of Kathmandu Valley residents and a critical source of water for millions,



(Figure 2.12: Tanker water deliveries form the backbone of urban water provision in many parts of the Kathmandu Valley, Photo and anonymization of license plate and contact number by author)

The night before my first time observing the labor of a tanker water delivery firsthand, I met up with Numa and some of the regular customers at the *bhatti*, before heading to Sita and Ram's place and then staying with a friend nearby so I could wake up before dawn to see the process of tanker water delivery for myself. The full monsoon had just arrived and the muddy lanes between Numa's *bhatti* and Sita and

Ram's house were now covered with water that was knee-deep in places. Many of the regular customers seated at Numa's place were happy that the monsoon had come a couple days early that year, while Ram assured me that the next day delivering water would be a shorter than usual one, given that the heavy rains had just started and customer demand would be lower than in the dry season when Ram would sometimes work delivering water from before dawn until well after dark (Interview 6/11/2018). A short time later I found myself unsuccessfully trying to avoid deep puddles in the pre-dawn light as I walked back to Ram and Sita's house before climbing into the cab of the tanker truck out front just as their chickens started waking up. After a short drive we picked up Rohit, Ram's young assistant, while I sat between the two of them in the cab of the truck as we drove to the source where Ram would fill up his truck tank with water (Participant-Observation 6/12/2018).

After we arrived, Rohit hopped out of the truck first and began to unravel large hoses connected to a pump, which he carefully placed into a torrent of fast-moving water. "Be careful", Ram called out to the two of us, as I had begun to jump out of the cab of the truck, "The water is very fast today after all this rain we've just had" (Participant-Observation 6/12/2018). We were near the very southern boundary of where the rapidly growing peri-urban neighborhoods of Lalitpur District met the steep and heavily forested foothills to the south. I would only much later come to learn that this location was one of the few places in the Kathmandu Valley where tanker truck drivers extract surface-water rather than draw from groundwater wells – often much deeper ones than the smaller communal wells where I had conducted previous

interviews. After nearly an hour waiting for the truck to fill with water – I would later learn that Ram’s 7000-liter tank was moderately sized as tanker trucks go, with tank capacity commonly ranging from 5000 to 12,000 liters – Rohit rolled up the hose and we drove a distance to a neighborhood not far from Ram and Sita’s house where we parked, Ram and Rohit unrolled the long hose and began to fill up an underground tank in a private home, while I waited in the cab of the truck parked around the corner from the house. When I learned that Ram had collected 2500 rupees (\$22 at the time of research) for the delivery of the full tank of water, I asked whether he could deliver to my own neighborhood in the urban core for the same price, given that I was expected to contribute toward the 2500 rupees cost of a 5000 liter delivery where I lived. Ram merely replied that he usually would charge extra to deliver water to core urban neighborhoods because it took an extra hour driving time each direction. “That neighborhood is always a little more expensive for deliveries”, Ram added, “but for you maybe I can make an exception” (6/12/2018). When I mentioned in it to my landlord, however, he told me that because the monsoon had just started that the municipal supply was better than it had been in months. After two more round-trips to collect and deliver water, Ram dropped Rohit back at his house, gave him a little money, re-fueled the truck, and then drove back to the house he shared with Sita. After the initial day riding along with Ram and Rohit during their deliveries of tanker truck water I was curious as to how representative their experiences were of other tanker truck drivers. I would later come to learn that Ram was in a relatively privileged position among tanker drivers in that he owned his own truck, which

although rusty and in need of some repairs, was already paid off in full. This allowed him more independence in deciding his own schedule and choosing where he made deliveries – Ram often tried to avoid core urban neighborhoods as the truck would often get stuck in traffic down the narrow lanes sometimes adding hours to water deliveries (Interview 7/18/2018). Nonetheless, Ram would often work very long hours during the dry season when demand for such deliveries was high in order to maintain a loyal customer base and to save money for a future day when his son was no longer a student and he could go back to his childhood village and live out a comfortable retirement (Interview 7/18/2018). On a second ride-along with Ram and Rohit later in the same year’s monsoon season, I noticed one other truck filling up water nearby. Given the large number of tanker trucks on the road across the city, I was surprised I didn’t see more trucks filling up from the fast moving river that came cascading down the densely forested foothills nearby. When I asked about where all of the other trucks filled their tanks, I was told “There are many places to fill water. Mostly deep wells, but those wells are all a long drive from here. Many truck drivers fill up from wells on the other side of the valley” (Participant-Observation 7/25/2018).

The only other driver I was introduced to in the first months after riding along with Ram and Rohit, Aditya, also filled his truck’s tank from the same surface-water source as Ram and Rohit. Unlike Ram, Aditya did not own his own truck, but rather served as one of two alternating drivers for an entrepreneur who owned two tanker trucks. Aditya’s boss was reluctant to meet with me, but I learned through Aditya that

the boss/entrepreneur drove a second newer truck himself, and then rented out his smaller, older truck to the two aspiring truckers who were saving money to try to buy a truck of their own (Interview 7/25/2018). Aditya gave me the names of a few other aspiring tanker entrepreneurs who lived in other parts of the valley when I mentioned I wanted to learn more about the tanker truck operators. Although I never rode along with these other drivers, like I did with Ram and Rohit, I was able to interview a few of them over the following months to get a better picture of the daily practices of the drivers and of the dynamics of the tanker water economy – a sector that supports thousands of people in the Kathmandu Valley, especially when taking into account informal neighborhood water vendors who buy water in bulk from the tanker trucks and then re-sell it to households in smaller quantities for a modest profit.

Although there are a limited number of tanker truck entrepreneurs who own more than one truck, which they then rent out for a profit, most drivers in the Kathmandu Valley are either single truck owner-operators, or renters, with many of the owner-operators of tanker trucks in debt (Interview 7/25/2018; Interview 8/13/2018; Interview 8/20/2018). In general the truck renters tend to be younger, often share the rental cost with a second driver, like Aditya did, and in most cases appear to be trying to save any extra money they earn to buy their own truck (Interview 7/25/2018; Interview 8/13/2018; Interview 8/20/2018). Ram's assistant Rohit was still too young for me to interview formally for this research, given current IRB protocols in the United States, but according to Ram, Rohit also planned to rent a tanker truck with another friend once he had a little more experience as a tanker operator (Interview



7/25/2018). Another tanker truck owner-operator, Shankar, whom I interviewed several weeks later told me he had worked as a long-distance truck driver for a larger trucking entrepreneur before saving money to buy a tanker truck so he could be closer to his family and not have to spend so many nights on the road sleeping in his truck (Interview 8/29/2018). Shankar had to pay a large down payment for his truck, but still had high monthly payments on a loan he took and mentioned several times he had trouble making ends meet during the monsoon months when business was slower and he couldn't charge quite as much for water as he did during the dry season (Interview 8/29/2018). I asked whether and how the drivers determined the price of their deliveries and Shankar told me that drivers could set their own prices, but a lot depended on the time of year and that when demand was lower customers would often haggle hard for a lower price and then hang up the phone and call another driver if they weren't satisfied with the price, the water quality, or if they felt they had to wait too long for a delivery (Interview 8/29/2018).

Although there are no formally fixed or set prices for tanker truck water, tanker truck drivers of the Kathmandu Valley did form an association back in 2000, the *Upatyaka Khanepani Tanker Byabhasi Sangh* (UKTBS) roughly translated as Valley Tanker Operators Entrepreneurs' Association, to advocate for their own interests and rights as essential service providers (Interview 7/25/2018; Interview 8/29/2018). On the individual level, each truck owner or entrepreneur acts as an independent service provider, in competition with other tanker truck owners and operators. There are no formal contracts or service agreements between the tanker entrepreneurs and

government officials or municipal entities to supply water to the municipalities, but the UKTBS does organize and mobilize against what its members view as external threats to the tanker drivers, such as efforts by government authorities to restrict service delivery times or to impose additional burdens on the truck drivers (Dangol et. al 2012; Interview 8/29/2018). One example of such mobilization by UKTBS members was collective action opposing proposed rules by Kathmandu Metropolitan City authorities to restrict the operation of large trucks to off-peak times in an effort to alleviate traffic congestion in core urban neighborhoods. UKTBS members successfully challenged this proposed initiative, arguing that water delivery services were too essential to be restricted to a particular time of day. Eventually restrictions on delivery times were tabled for the water tankers but imposed for other types of delivery trucks and construction vehicles (Interview 8/13/2018; Interview 8/29/2018). A UKTBS sub-committee does regulate the times at which drivers can withdraw groundwater from particular deep wells that many trucks draw water from in the northwestern corner of the Kathmandu Valley (Interview 8/13/2018). Nonetheless, not all tanker drivers draw water from this area and there are no over-arching professional requirements for membership or participation in the UKTBS – rather the organization was formed to advocate for independent drivers in response to perceived external threats, and participation in the group is voluntary (Interview 8/13/2018; Interview 8/29/2018).

Although one UKTBS sub-committee attempts to self-regulate the times of day when particular drivers withdraw groundwater from specific co-owned wells in one corner

of the Kathmandu Valley, there is no single overarching framework or authority that regulates tanker water withdrawals and extractions overall, while existing knowledge of tanker groundwater production relative to safe yield is patchy at best. The surface-water source where Ram came to fill his truck with water is located on the opposite side of the valley from the wells that many other drivers use and does not fall under the *de facto* purview of any UKTBS committee or regulatory agency. Although one former Village Development Committee (VDC) of Matatirtha did attempt to enforce a ban on tanker truck withdrawals from deep aquifer borewells within its own jurisdiction, there is no valley-wide regulation of such withdrawals. Although scientific studies on the impacts of tanker trucks, specifically, are very limited in number and scope, Dangol et. al's (2012) study on water markets broadly estimates that as of 2011 tanker truck groundwater withdrawals ranged from an estimated 13.8 MLD in the monsoon to 23 MLD in the dry season. In comparison, a 1994 consulting study estimated safe yield from the Kathmandu Valley basin as a whole to be 26 MLD, although other consulting reports have given highly variable ranges for the basin's safe yield (Binnie and Associates 1988; Stanley Consulting 1994). The same report that estimated a safe yield of 26 MLD also estimated that total withdrawals valley-wide were roughly 56 MLD, with nearly half of total groundwater withdrawals being tanker deliveries (Dangol et. al 2012; Stanley Associates 1994). Although more recent figures are not available, demand for tanker water and the number of tanker operators has continued to increase over the past decade, while groundwater levels have fallen at many locations in the basin.

As more ancient water sources and the indigenous *hiti* run dry or become contaminated people have no choice but to rely more on buying water or on investing in private household infrastructure (Gurung et. al; Molden, Prakash and Khanal 2020) Multiple sources and systems of such water “form a complex meshwork where boundaries of formal and informal, legal and illegal, public and private all become entangled” (Molden et. al 2020:135). Starting in 2006, KVWSMB, a new statutorily created entity was given formal authority to initiate licenses to withdraw groundwater from the Kathmandu Valley Basin (Dangol et. al 2006). In the years since, however, KVWSMB has not involved itself with licensing for tanker truck withdrawals or informal vendors, focusing instead on working with municipal water agencies like KUKL to develop well operating policies, and leaving the large private and informal water sectors outside the scope of formal government licensing and regulation (Dangol et. al 2012). Some municipalities have attempted to develop their own policies for such withdrawals, such as the ban on deep borewell extraction by tanker truck entrepreneurs in the VDC of Matatirtha. Nonetheless, such policies remain patchwork in scope and do not apply to the overwhelming share of water withdrawals taking place across the basin, most of which are not reported or monitored in any consistent way by existing state regulatory authorities. For the tanker drivers themselves, a system of self-regulation takes place only at busy cooperatively-managed wells where multiple drivers stop to fill up their tanks (Interview 8/13/2018; Interview 8/29/2018). Though tanker drivers have been successful at organizing to prevent external restrictions by government authorities in many cases, their own

long-term livelihoods, too, are precarious given the high debt loads many owner-operators carry and the potential for sharp drops in price during times of abundant supply of water. In the long-term, conjunctive management strategies that link together the connections between domestic water supply and aquifer health, between the economic benefits that come from having more reliable household water and the economic incentives driving informal water economies are likely to see more success than strategies that attempt to address any one of these issues individually from other needs.

One of the challenges for any complex society striving to transition toward a more viable and sustainable future is addressing the mismatch between the laborers and workers of today whose toils fill critical basic human needs and the demand for new and transformed forms of labor in the near future. In the short and mid-term the availability of imported Melamchi water in the Kathmandu Valley in the near future will likely ease household struggles and shortages, while in the short and mid-term the burgeoning areas beyond the municipal water network will also likely sustain the livelihoods of many existing tanker truck drivers. In the longer-term, however, the needs of the multiple constituencies and labor and occupational groups may well benefit from careful and deliberate policy strategies that make use of the inter-connected character of the Kathmandu Valley's inter-connected water systems and systems of social relations, while also remaining mindful and attentive to providing remedies to particular inequalities and exclusions that past large-scale projects have produced.

The challenges and daily struggles that residents like the ones described in this chapter have faced for decades is one of the primary reasons why government authorities have staked so much political capital on the promise of inter-basin transfers from the Melamchi Valley. In the following chapter, I trace the long and obstreperous history of elite-driven planning efforts to bring imported water to the Kathmandu Valley. In the first chapter of this work, I traced the long history of the Kathmandu Valley's ancient indigenous water technologies, drawing attention to the social relations embedded in the valley's long history of water technologies and the influence of foreign relations and historical geopolitics on intractable inequalities that persist into the contemporary period.

In this chapter, I have endeavored to describe the daily routines, practices and water micropolitics experienced by Kathmandu Valley inhabitants to explain current water struggles and suggest some of the differential effects and impacts that the availability of imported MWSP will have on various categories of water users based on economic status, geographic location and proximity to alternate water sources. For residents of core urban neighborhoods where piped municipal water is already available the tangible benefits of supplemental Melamchi water are clear and unequivocal. For others, efforts to link the availability of MWSP water with groundwater recharge and pond restoration would carry much more wide-ranging beneficial impacts. Residents of informal and unauthorized support require additional social and policy interventions above and beyond what the dreams of Melamchi water alone can provide for them to truly have the capabilities to achieve what they value and have

reason to value. Nonetheless, the prospect of injecting supplemental water into the valley's channels, ponds and waterways carries with it the potential to re-vitalize the traditional water systems of the Kathmandu Valley, while reducing the extent to which residents of the dense urban core rely on groundwater extraction to meet domestic household needs. Though these measures alone are insufficient to correct some of the water injustices suffered by communities such as squatters and small farmers who have been dispossessed, they are a step in the direction toward improving and preserving the very infrastructure that has supported urban settlement in the valley for nearly two millennia.

Recent anecdotal and scientific evidence both suggest that the very indigenous water systems that have sustained urban civilizations in the Kathmandu Valley for many centuries can continue to do so well into the future if care is taken to invest in these systems in make them viable. For instance, re-investment in the ancient pond-reservoir in Madhyapur Thimi had the effect of raising groundwater levels in many private and community wells (Bajracharya et. al 2020; Interview 6/15/2019). Many more ancient reservoir systems like this that could also benefit from further investment and re-filling – something that will be made easier when more supplemental water arrives. In the meantime, a growing number of households have already realized the benefits of rainwater harvesting and making more effective use of the resources and technologies that have already been present for centuries. Part and parcel with this is a growing movement to restore ancient reservoir ponds, clean and maintain those *hiti* that are still functioning, and make the Kathmandu Valley's own

native Newari language and history a required component of school curricula for the first time in Kathmandu's modern history.

In the next chapter I will investigate in greater detail the inter-linkages between the slow, tortuous implementation of the MWSP, Nepal's own recent political history and transformations and how the interactions between these two have been shaped and constrained by international lending organizations and global geopolitics in ways that have shaped the path of Nepal's elite driven planning processes. I will then finally return with some follow-up remarks with directions for future research now that the flow of Melamchi water is being tested in the now-complete tunnels.



### ***Chapter 3: Elite-Driven Infrastructure Planning: Melamchi Water, Political Change and Pressures from above and below***

Many of the narratives and experiences of daily water practices among urban residents of the Kathmandu Valley are reflective and indicative of much longer processes of burgeoning growth that has exceeded the capacities of the Kathmandu Valley's own ancient, indigenous water technologies. Ever since the Rana-era leaders began diverting water from previously public sources to supply their own personal needs, many of the longstanding technologies and social institutions that have supplied urban water over the centuries have entered a period of decline. Since the mid 20<sup>th</sup> century, rapid population growth has put additional pressure on local surface and groundwater, while policies and institutions haven't evolved as quickly as the Kathmandu Valley's population has grown and transformed. Despite this, efforts have been underway for decades by political leaders and planning elites to supplement the Kathmandu Valley's dwindling water supplies through large-scale infrastructure mega-projects. These mega-projects have been mediated by the rapidly changing socio-political dynamics of modern Nepal and their success has been linked inextricably to the social and political relations of the day.

In this chapter, I trace the development of elite-driven urban water provision and public infrastructure development in present-day Kathmandu, and specifically, the socio-political forces driving the slow, obstreperous implementation of the Melamchi Water Supply Project (MWSP). Drawing upon project documents and reports, impact assessments, news reports, and interviews with planners and civil society, I describe

how the MWSP has been, since its inception, both politically contested and geophysically precarious. The Kathmandu Valley has been urbanizing at a rapid rate since the mid 20<sup>th</sup> century, but the political focus on rural development of the previous authoritarian Panchayat regime meant that it was only in the late 1980s that significant resources began to be devoted to urban water supply in the Kathmandu Valley. After the re-emergence of democracy in 1990, several successive administrations attempted to address the burgeoning Kathmandu Valley's perennial water shortages, but efforts to bring supplemental water to Kathmandu initially proved elusive in a period marked by rapid changes in leadership and uncertainty among international lending organizations.

An initial lending agreement to finance the MWSP had to be re-configured after conflict broke out between a Maoist insurgency and state security forces, leading to ten years of civil war and the ultimate collapse of the monarchy in Nepal. The entry of the Maoists into mainstream politics sparked a demand for greater public control of the water supply, leading to an eventual rejection of neoliberal lending models that excluded the state, in favor of private enterprise in the provision of public services. While the eventual lending agreement between the Asian Development Bank (ADB) and Government of Nepal (GoN) ultimately kept urban water infrastructure under the control of a newly created state entity – KUKL – delays and elite-driven deliberations continue to be a source of contention. These political challenges were compounded by the 2015 Gorkha earthquake. The earthquake not only caused damages at the construction site, but also fundamentally altered the hydrogeology of Melamchi and

Indrawati Basins (scientific findings are still limited in scope, but a discussion of the potential impacts for future research will be discussed in the conclusion).

Fieldwork conducted between 2017 and 2019 subsequently draws upon interviews from multiple sources, employing a polymorphous methodological approach to reflect critically on the multi-national forces behind elite-driven development processes that have thus far failed to achieve their stated objective of improving public, urban water provision in the Kathmandu Valley. This chapter contributes to longstanding debates in the political ecology of water, providing new evidence about an unequal triangular relationship between access to knowledge and information between government leaders, representatives for international lending agencies and the general public.

Initial interviews with local officials early in my fieldwork provided some cause for optimism around equity concerns, but some of these respondents refused follow-up interviews once the MWSP hit significant new roadblocks and delays. Foreign contractor consultants provided data and training information on how they plan to “professionalize” water management departments in Nepal. Representatives from international development agencies also helped facilitate access to additional documents and information, but also acknowledged concerns about transparency and reliability when it comes to public decision-making in Nepal. Requests for interviews with leading policy-makers involved in the MWSP went unanswered during critical stages of this research.

Given the challenges of gaining entree as an outsider into some of the most selective management and policy-making circles, I rely on interviews with civil society representatives and journalists to illuminate further how new privacy laws are shutting more and more citizens out from “public” government proceedings. Findings from these interviews are further buttressed with additional evidence from contemporary academic literature on Nepal, semi-structured interviews with Kathmandu water users, and by ongoing debates over the role of geopolitics in shaping which development models different states choose at different times. In particular, I aim to situate the challenges of implementing the MWSP against a backdrop of increased competition between external forces, such as China, India and the United States, that shape and constrain the pathways for smaller nation-states to implement large-scale infrastructure projects like the MWSP. During the course of this fieldwork the GoN signed on to China’s Belt and Road Initiative (BRI), the US federal government started a trade war with China, the US State Department unsuccessfully lobbied the GoN to sign on to development initiatives under the umbrella of its Indo-Pacific Strategy, and a private Italian engineering contractor was replaced by a Chinese SOE to complete the Melamchi tunnels. In addition to reflecting on elite-driven processes driving the Melamchi project in Nepal, this section also serves a cautionary tale to researchers, practitioners and policy-makers in wealthy democracies about the perils of compelling leaders and elites of smaller, non-aligned states to sign onto development initiatives conceived through the prism of great power competition. While earlier 1990s-era efforts to implement the MWSP

through the erstwhile neoliberal orthodoxies of Structural Adjustment Programs (SAPs) failed spectacularly at winning domestic support, so too will development initiatives that appear to compel local decision-makers to choose sides in a contentious geopolitical stand-off between larger powers.

In the remainder of this chapter, I first highlight the tortuous process through which Nepalese and foreign consultants and decision-makers came to the conclusion that the diversion of Melamchi River water to the Kathmandu Valley was necessary in the first place. This process was inextricably linked to the political transformations and ongoing processes of state-making in Nepal over the past five decades. This enables an analysis of how the emergence of multi-party democracy in 1990 was pivotal in moving project planning forward, coupled with attention to how the prevailing neoliberal orthodoxies of international lending organizations of the day originally envisioned a project under private control and ownership (Bakker 2003; Bakker 2007). These plans were ultimately challenged during the following decade when political unrest in Nepal, and concerns over private ownership of the water supply, led to a new model that would provide a greater public role in managing Melamchi water. The implementation of these plans began to move forward but was delayed further after the 2015 Gorkha earthquake opened up new political fault lines between the GoN and the private contractor responsible for building the Melamchi tunnels. Finally, I highlight the challenges of conducting ethnographic fieldwork of elite-driven initiatives, the continued role that civil society and international organizations play in driving large-scale infrastructure projects, and the enduring appeal of state-

driven developmentalism in places like Nepal, as an alternative to neoliberal models that rely more heavily management by private firms and that require structural adjustments and loan conditionality.

*Searching for Supplemental Water: Scarcity in a growing metropolis*

The earliest efforts to provide water to the general public in Nepal through non-traditional means – i.e. modern piped water, as opposed to the ancient *hiti* – coincided with the initial period of Nepal’s brief experiment with democracy in the 1950s. After the collapse of the Rana Dynasty in 1951, and before the Shah Dynasty re-asserted absolute political power through the *panchayat* system in 1962, the democratically elected Government of Nepal (GoN), initiated a series of plans to improve water access to the general public (JVS 2018). The first Five Year Plan of the GoN published in 1956 included provisions for boosting the public supply of government water and sanitation (JVS 2018). Initial efforts toward meeting these goals were limited by a lack of funding, but the Five Year Plan of 1956 marked the first time that the provision of modern sanitation facilities and piped water for the general public were listed as specific policy goals in government planning documents (GWP 2018; JVS 2018). Despite this, augmenting urban water supply in the Kathmandu Valley was not a major focus during the brief period of democracy in Nepal in the 1950s. Existing public taps based on ancient water technologies continued to meet the needs of the urban core during this period, while surface and groundwater resources were relatively abundant in supply and of sufficient quality to serve the needs of the more

rural portions of the Kathmandu Valley(Chinnasamy and Shrestha 2019; JVS 2018; Pradhan 1990; Tiwari 2016).

The political dynamics in Nepal changed drastically in 1959 after several years of unstable, yet democratically elected coalition governments. In 1959 the Nepali Congress (NC) Party, modeled after the namesake Congress Party that played a pivotal role in the Indian independence movement, won a decisive majority in parliamentary elections (Baral 1973; Neupane 2015). Though King Mahendra, in his role as constitutional monarch, had continued to wield significant influence over the fractious, faction-laden party system throughout the 1950s, the NC's decisive win in 1959 posed the greatest challenge yet to the monarchy's influence over Nepalese politics. Threatened by the specter that the NC would ultimately further constitutionalize and liberalize the role of the monarchy, King Mahendra ultimately set out to overthrow the centralized parliament in a coup d'etat that would invoke the rhetoric of direct and local, community-based control over social and political affairs (Baral 1973: 1-3). King Mahendra called his new system the *Panchayat*, based on the Nepali language term for traditional local bodies of village elders that historically were responsible for community-level governance and decision-making in Gorkhali (*khas kura*) speaking communities of the hills of Nepal<sup>12</sup>. This new political system

---

1. 12 The term *panchayat* translates most literally as 'council of five' with the word 'panch' meaning five in the Sanskrit-based, Indo-Aryan languages. This system of local, community decision-making was common in communities that spoke the Nepali language (also known as *khas kura*, or *gorkhali*), but was not native to most *adivasi janajati* (indigenous) communities of Nepal. Local village councils are also referred to as *panchayat* in contemporary India, though these bodies are democratically elected and are structured differently than the *panchayat* in Shah Dynasty Nepal, which served effectively as a rubber stamp for the agenda of the king.

was essentially a pyramidal monolith that claimed to be derived from the grassroots, but was, in effect, a system of absolute rule for implementing the policy prerogatives of the monarch through loyalists installed at the village, town, district and national, or *rastriya panchayat*, levels (Baral 1973). Though periodic village-level elections did take place, preserving the veneer of local democracy and control, all political parties were banned and candidates for local elections vetted from the center.

After the collapse of Nepal's brief experiment with democracy in the 1950s, the development of urban infrastructure and amenities took a back seat to promoting national unity through a program of enforced cultural and linguistic assimilation and homogenization. This was predicated on the Hindu religion, Nepali language and institution of the monarchy as three pillars of national identity, and propagated under the slogan "*ek raja, ek bhesh, ek bhasa, ek desh*" (one king, one dress, one language, one country) (Kharel and KC 2018). Though a common language and identity had already existed for centuries in some of the regions of Nepal that were historically part of the Kingdom of Gorkha, King Mahendra Shah sought to extend the push for a common language to all corners of his kingdom, including to the indigenous Newari community of the Kathmandu Valley, which had historically resisted the wholesale adoption of Indo-Aryan languages through successive waves of rulers and dynasties (Khanal 2019; Kharel and KC 2018). The early 1960s witnessed a consolidation of the power of the monarch with several prominent political leaders, such as Nepal's first democratically elected leader, B.P. Koirala, jailed for defying the king. Many other parliamentarians who had served in the democratically elected Nepali Congress



(NC) Party, in particular, fled to India where several continued writing and publishing in exile (Baral 1973).

Although promoting a unified national identity and consolidating the power of the monarchy were primary goals during the Panchayat era, King Mahendra Shah also did take some steps toward addressing the highly unequal social relations of the earlier period of Rana rule. While constitutional monarchy with a democratically elected parliament only lasted for eight years prior to King Mahendra's consolidation of power, the Shah monarchy had been effectively marginalized to a merely ceremonial role for more than a century prior, with autocratic, hereditary Rana 'prime ministers' wielding absolute political power from 1846 until 1951. Thus one of King Mahendra's first policies beyond the promotion of national unity was to appropriate and re-distribute land that had previously been under private Rana control and to strip erstwhile Rana elites of all remaining aristocratic privileges (Thapa 2015). This initially helped King Mahendra consolidate popular support in an effort to gain legitimacy by promoting himself as a man of the people (Thapa 2015). Subsequent efforts on land reform whose putative goal was to help the rural poor proved to be less successful (Kharel and KC 2018). Nonetheless, a new *Muluki Ain* (national legal code) was promulgated in 1963 with the aim of undoing the legacies of legal inequality that were first established in the 1854 code and promoting full equal rights under the law for all citizens. Though the *Muluki Ain* of 1963 has been amended many times since to reflect the changing political and social dynamics in Nepal, some

of the core elements devoted to equal protection under the law remain in effect to this day (Thapa 2015).

Although urban infrastructure development was not a central priority during the early years of Panchayat rule, the practice of adopting national development plans continued throughout the Panchayat era. After the democratically-elected parliament was dissolved another Five Year Plan did not materialize on schedule, due to the king's political priorities being focused on other issues (Kharel and KC 2018). Nonetheless, a nominal three-year duration development plan was introduced two years after King Mahendra's consolidation of power, with regularly scheduled plans resuming with the Third Five Year Development Plan of 1965-1970 (Srivastava 2008). These initial plans focused largely on strengthening the scope and power of local-level *panchayat* councils to implement initiatives by royal decree (Interview 5/23/2019). Nonetheless, building transportation and communication infrastructure were also central to these early development plans with the aim of bringing far-flung and remote districts into closer contact with the ruling elite in Kathmandu. Given the challenges of building roads through the hilly terrain, however, many district headquarters remained several days' walk from the nearest road throughout the Panchayat era. This would ultimately help facilitate the proliferation of resistance movements as the era wore on, with banned political organizations initially emerging in some of the most far-flung districts before spreading more broadly across the country (Adhikari 2014).

While the Third and the Fourth Five Year Plans were introduced with little explicit mention of water infrastructure, a Department of Water Supply and Sewerage was established in 1972 by royal decree, which would later evolve into the Ministry of Water Supply (Ministry of Water Supply 2019). Although a *Pani Goshwara Adda* (Water Purveyor Office) existed in the Kathmandu Valley since the 1890s, it was originally established to provide maintenance only for the private household and sanitation systems of the Rana Dynasty rulers and did not play a role in serving the general public. For most of the 20<sup>th</sup> century the ancient *hiti*, or public taps continued to serve residents of the dense urban core, while surface water and groundwater served irrigation and household needs elsewhere in the Kathmandu Valley (Interview 5/14/2019; Neupane 2015; Pradhan 1990). Nonetheless, by the early 1970s there were increasing signs of water stress in the urban cores of Kathmandu and Patan, with the level of flow at some of the *hiti* reduced below the levels seen throughout most of the valley's history (Interview 5/14/2019; Neupane 2015). Census figures from the Nepal Census of 1971 indicate that the population of Kathmandu city proper had exceeded 150,000 by this point in time, while the broader population of the Kathmandu Valley, including rural areas, had exceeded 500,000 (Nepal Census 1971). These trends of population growth prompted the newly created Department of Water Supply and Sewerage to begin a formal study of the Kathmandu Valley's water resources for the first time in Nepal's modern history (Ministry of Water Supply 2019).

Within a year of its creation, the then-named Department of Water Supply and Sewerage first suggested exploring the possibility of inter-basin water transfers to

supplement the Kathmandu Valley's surface and groundwater resources (Lees, Ahmad and Bhattarai 2015). At the time, large-scale water infrastructure projects were being built in neighboring India, while foreign governmental development agencies, such as USAID and the Japan Overseas Cooperation Volunteer office (later JICA), had recently established a presence in Nepal and were providing funding and technical assistance for measures such as USAID support for the implementation of the 1971 census (Banister 1981; Nepal Census 1971). Nonetheless, the local availability of water resources was generally considered sufficient to meet the needs of the population in 1973 and a pre-feasibility study on inter-basin transfers to the Kathmandu Valley wouldn't be conducted until 1988 (Lees, Ahmad and Bhattarai 2015). While water levels in some of the canals that supplied the *hiti* in the urban cores had begun to drop by this time period, more citizens began turning to other supplies of water, such as wells for groundwater, which remained relatively close to the surface throughout the 1970s. Indeed, Chinnaswamy and Shrestha's (2019) study confirms that groundwater levels in the Kathmandu Valley remained relatively stable throughout the end of the 1980s, with significant measurable overdraft of the Kathmandu Valley's groundwater basins only beginning to occur from around 1990 onward, and subsequently accelerating over each of the following decades.

The ensuing decade and a half of Panchayat rule in Nepal saw few substantive investments in the urban water infrastructure of the Kathmandu Valley by any state agencies. Nepal remained a largely rural country throughout this time period, with the 1971 Nepal Census indicating that only 4% of the national population lived in urban

areas with 94.6% of the total labor force engaged in primary production agriculture (Nepal Census 1971). Precise statistics from the Panchayat era, however, are hard to come by. Even the 1971 Nepal Census, which involved significant funding and technical assistance from USAID, relied heavily on estimations and approximation for vital statistics and demographic indicators. For example, roughly half the adult population who self-reported being over the age of 30 at the time of the 1971 census reported an age ending either in the digit -0 or the digit -5 (Nepal Census 1971). Adults over the age of 30 self-reporting an age ending in any of the other eight digits constituted less than half of such respondents (Nepal Census 1971). Population estimates of the Kathmandu Valley's urban population were likely somewhat more accurate during this period. Representatives from the city's Panchayat Council would go door to door, counting every physical structure, including temporary ones, and enumerating each and every occupant who lived there (Banister 1981; Interview 5/18/2019; Nepal Census 1971). Beyond census efforts, however, state-sponsored urban infrastructure initiatives remained limited throughout the 1970s (Adhikari 2014; Neupane 2015). After King Mahendra's death in 1972, his newly-crowned son, King Birendra, launched his signature "Go to the village" initiative emphasizing the promotion of agriculture and rural life, a focus which would endure throughout the remainder of the Panchayat era.

Although detailed statistics and urban planning initiatives remained limited in scope throughout the 1970s and much of the 1980s, the rapid unplanned population growth of the Kathmandu Valley during this period was clear and unequivocal. Estimates

from the United Nations' (UN) World Population Prospects indicate an urban population growth rate of in the range of 4-5% per *annum* throughout the 1970s, eventually exceeding 6% growth per *annum* for much of the 1980s (UN WPP 2019). LANDSAT images for the latter portion of the period of rapid population growth confirm a commensurate expansion of the urban built-up area, along with indicators of groundwater overdraft beginning in the latter part of the 1980s (Chinnaswamy and Shrestha 2019; Ishtiaque, Shrestha and Chhetri 2017). To address the challenges of this rapid growth, representatives of the international donor community requested that the World Bank get involved in financing urban water infrastructure, including financing the expansion of the piped water network and building sewers and water treatment plants (Whittington et. al 2004; World Bank 2020). Although three small-scale projects were executed during the period from 1975-1987, these projects were widely viewed as unsuccessful (Interview 3/2/2018; Whittington et. al 2004). The water treatment plants that were meant to be financed by these projects were never brought online and costs associated with infrastructure expansion were not recovered, while the public water supply that did exist was limited in its geographic reach and quality, leading many newcomers to the Kathmandu Valley to seek water from other sources (Interview 11/14/2017; Interview 12/3/2017; Interview 3/2/2018; Whittington et. al 2004; World Bank 2020).

To address shortfalls in the supply of publicly available water, many of the new urban dwellers arriving during this period dug their own wells, with groundwater levels initially only two to three meters below the surface in some of the neighborhoods that

witnessed the most rapid growth during the 1970s and 1980s (Chinnaswamy and Shrestha 2019; Interview 11/14/2017; Interview 12/3/2017; Interview 3/2/2018).

Surface water sources such as streams and rivers also continued to provide water for domestic tasks such as laundry and bathing during this period, although the share of residents relying on surface water began to decline as the population continued to grow and water quality declined (Interview 11/14/2017; Interview 3/2/2018).

Although the projects supported by the international donor community and the World Bank during the 1970s and 1980s included provisions for wastewater treatment plants, these facilities were never brought online on a large-scale resulting in most household sewage and industrial waste continuing to be discharged into local waterways untreated (Interview 3/2/2018; Whittington et. al 2004; World Bank 2020).

While a number of older interview respondents reminisced that in the early and mid-1970s the water quality in local streams and rivers was still of sufficient quality for bathing, swimming and fishing, these activities declined drastically in the decades that followed, while a number of local waterways no longer support significant fish populations in the present day (Interview 11/3/2017; Interview 11/14/2017; Interview 12/3/2017).

The rapid urban growth of the 1980s also coincided with a growing, albeit underground, resistance movement to the absolutist rule of Panchayat system (Adhikari 2014). Elections were held in 1981 and 1986, but the only candidates on the ballot were those pre-approved with royal consent, with political parties still banned and little in the way of a policy platform beyond implementing the will of the

monarch (Interview 5/18/2019). While much of the strongest resistance to the institution of the monarchy ultimately emerged in far-flung rural districts, a growing number of relatively affluent college and university students in the Kathmandu Valley were exposed to banned political parties and underground resistance movements as the 1980s progressed (Adhikari 2014). The harsh punishments associated with participating in a banned political movement meant that these underground parties were initially fragmented, discrete entities, with a number of small communist-leaning parties emerging among students at universities of the Kathmandu Valley during the 1980s (Interview 5/18/2019). Increased trade, travel and exchange between Nepal and India during the latter years of Panchayat rule also enabled contact and communication between younger, relatively affluent student leaders in Nepal and older exiled members of the banned Nepali Congress (NC) Party, several of whom had continued publishing in the Nepali language while living in exile in India (Adhikari 2014; Interview 5/18/2019). Nonetheless, most of the younger student leaders gravitated toward an ideological embrace of democratic socialism with public ownership of the means of production, while older supporters of the NC tended to emphasize closer relations with India and some steps toward market reform (Thapaliya 2019). Though some members of the NC old guard were ultimately granted ballot access for some village-level Panchayat councils starting in 1987, it would be a few more years before members of the various underground political organizations of the 1980s would unite to demand more substantive changes to the political system (Thapaliya 2019).



During the waning years of the Panchayat system in Nepal, representatives from the Department of Water Supply and Sewerage began to acknowledge that rapid population growth in the Kathmandu Valley was placing a critical level of stress on locally available water resources. The Kathmandu Valley is the only populous valley in the Middle Hills of Nepal without access to a glacial-fed river (ADB 2017; Ministry of Water Supply 2019), and after years of official indifference to urban development issues in favor of a “Go to the village” campaign, there was a renewed focus on the once-tabled initiative to begin exploring the possibility of inter-basin water transfers to the Kathmandu Valley (Interview 5/18/2019; Lees, Ahmad and Bhattarai 2015). Starting in May 1987 – the same year that candidates previously affiliated with the NC were permitted ballot access to serve on Panchayat village councils – the Department of Water Supply and Sewerage hired engineering consultants from a UK-based firm to conduct a one-year pre-feasibility study exploring possible inter-basin water transfers to the Kathmandu Valley (Binnie Associates 1988; Lees, Ahmad and Bhattari 2015). The report that would ultimately emerge from the pre-feasibility study was reviewed twice by representatives from the World Bank and was focused on the ability to deliver sufficient supplemental water to meet the needs of projected population growth through 2011 (Binnie Associates 1988).

While the pre-feasibility report on inter-basin water transfers explored the possibility of bringing water from multiple neighboring basins to the Kathmandu Valley, diverting water from the Melamchi River was ultimately selected as the best option (ADB 2017; Binnie Associates 1988; Lees, Ahmad and Bhattarai 2015). The

neighboring Trishuli River Basin located to the west-northwest of the Kathmandu Valley was of a lesser linear distance, which would have required shorter tunnels, and has a much higher annual discharge than that of the Upper Melamchi River. The disadvantage to diverting the Trishuli River, however, is that its basin is hundreds of meters lower in elevation than the Kathmandu Valley floor, which would have required energy-intensive pumping mechanisms to deliver the water – something that was considered unrealistic given the limited capacity to generate electricity in the region at the time of the study (Binnie and Associates 1988; Interview 10/27/2017). Similar challenges with the elevation gradient held true for numerous smaller basins that were also explored in the report. Moreover, the Melamchi River site was deemed well-suited to future hydropower development, despite its technical challenges. While diverting water from the upper reaches of the Melamchi River to the northeast would require significantly longer tunneling works, including through geologically challenging rock forms, once the 28-kilometer tunnels were complete, extending the infrastructure to divert water from the nearby Indrawati Basin in a second phase would require much shorter tunnels (ADB 2013; Binnie and Associates 1988).

### *Revolution, Democracy, Market Reforms and a Renewed Focus on Urban*

#### *Infrastructure*

In the years immediately following the publication of the pre-feasibility study on inter-basin water transfers to the Kathmandu Valley, Nepal experienced a series of rapid political changes that occurred concomitantly with a renewed push to build enhanced urban infrastructure. During the late 1980s many of the smaller, discrete

student and professional communist groups started banding together and by 1989 had formed the United Left Front, marking the first new broad-based political organization to emerge since the start of the Panchayat era nearly three decades earlier (Thapaliya 2019). The United Left Front soon joined forces with the older Nepali Congress to demand the re-establishment of multi-party democracy in Nepal. While the two organizations differed in their views on the role of the market economy in society and, to some degree, in their attitudes toward relations with India, both groups banded together to demand that the king lift the existing ban on political parties and allow for free, fair and open elections to any candidate wanting to run for public office (Adhikari 2014; Thapaliya 2019). After the king banned all newspapers critical of him and had leaders from both groups arrested on February 17, 1990, a mass movement of people took to the streets of the Kathmandu Valley the following day in what would become known as the *Jana Andolan*, or People's Movement<sup>13</sup>. Popular support for the *Jana Andolan* surged after riot police opened fire on the protesters killing 12. Far from quelling the protests, news of the shooting prompted hundreds of thousands to take to the streets of the Kathmandu Valley demanding an

---

13 The *Jana Andolan* of 1990 is often referred to as the First People's Movement in political discourse in contemporary Nepal. Participants in this movement, including those from the Nepali Congress and United Left Front – later named the Communist Party of Nepal-United Marxist, Leninist (CPN-UML) – took to the streets with the goal of ending the Panchayat system and allowing free and fair elections. Participants in the later Maoist-led People's War also referred to their movement as *Jana Andolan* or Second People's Movement. The Second People's Movement initially was focused not on restoring democracy, however, but on overthrowing what participants viewed as the dictatorship of the bourgeoisie, which initially included democratically-elected members of the NC and CPN-UML parties in Nepal's parliament.

end to the Panchayat system (Interview 5/18/2019). Initially, the king refused to entertain the protesters' demands, causing the protests to spread across the country, The *Jana Andolan* of 1990 lasted for nearly two months during which time the entire country was paralyzed by *bandh*, or general strikes (Adhikari 2014; Thapaliya 2019). In the weeks initially following the execution of 12 protesters in the Kathmandu Valley by riot police, several hundred youth were arrested, and hundreds more injured, in clashes between student groups, banned political parties and police that were becoming increasingly violent. After hundreds of thousands of additional protesters started arriving in the Kathmandu Valley from the countryside, the Nepal Army took over crowd control from local riot police, eventually opening fire into a crowd of demonstrators gathered in Patan (Dahal 2016). This resulted in crowds of hundreds of thousands ultimately swarming and surrounding government buildings, blocking entrances to the royal palace and surrounding police headquarters (Dahal 2016). By that point police and army officials had stopped engaging with the demonstrators altogether, prompting the king to lift the ban on political parties effective April 8, 1990 (Dahal 2016; Thapaliya 2019). A new constitution was drafted later that year, replacing the Panchayat system and ultimately resulting in a transition from absolute monarchy to constitutional monarchy. With the prospect of upcoming democratic elections, candidates running both for national and local Kathmandu Valley offices campaigned heavily on promises of improving infrastructure that had been neglected during the decades of Panchayat rule.

Shortly after King Mahendra Shah lifted the Panchayat era ban on political parties in April 1990, Nepali Congress (NC) leader, Krishna Prasad Bhattarai, became acting prime minister of Nepal and made the promise of bringing Melamchi water to Kathmandu central to his campaign in the first free and open national elections of the post-Panchayat era (Kathmandu Post 2/27/2021; Poudel 2021). After the 1990 Constitution of Nepal was promulgated in November of that year, with Bhattarai serving as interim prime minister, the first general election campaign since the restoration of democracy in Nepal focused heavily on the liberalization of society, infrastructure and development issues, with the two main organizations involved in the *Jana Andolan*, the NC and the Communist Party of Nepal-United Marxist Leninist (CPN-UML), as the main two competitive political parties (Thapaliya 2019). Former Panchayat officials formed their own party, the *Rastriya Prajatantra Party* (RPP), in an effort to hold onto the political power they had previously enjoyed, but the RPP failed to garner the level of popular support enjoyed by the NC and the CPN-UML. During the campaign, acting Prime Minister Krishna Prasad Bhattarai promised to bring Melamchi water to Kathmandu in such quantities that there would be enough water to wash every street and alleyway in the city with surplus Melamchi water (Poudel 2021). Bhattarai's NC Party ended up winning a majority of 110 out of 205 seats in parliament, but Bhattarai himself ended up losing out on the top job to Girija Prasad Koirala after an inter-party rivalry. Bhattarai ultimately stayed on in a leadership role in the NC, serving as foreign minister under Koirala, while the other main organization involved in the *Jana Andolan*, the CPN-UML ended up winning 69

out of 205 seats, serving as the main opposition party in the first freely elected parliament of the post-Panchayat era. The former Panchayat officials of the RPP, on the other hand, only ended up winning four seats out of 205 compared with a combined 179 seats for the two main parties that drove the pro-democracy movement (Thapaliya 2019).

Although Prime Ministers Krishna Prasad Bhattarai and Girija Prasad Koirala of the NC Party shared similar views on many political issues of the day, Koirala represented a more rural district in parliament and thus shifted the focus of his new administration more strongly toward improving health care and education than on urban infrastructure development. Despite this, follow-up work did continue on assessing the feasibility of bringing Melamchi water to Kathmandu, albeit with less zeal and passion than may have been the case had Bhattarai retained the prime ministership in the 1991 elections (Interview 4/15/2018). A pre-feasibility environmental impact assessment (EIA) was conducted by a Canadian engineering firm at the time of the political transition to constitutional monarchy in 1990, while a full feasibility study was conducted by an Australian firm in 1992. The 1990 EIA recommended dropping the hydropower component as proposed in the earlier 1988 study, while the 1992 study recommended that the water diversions proceed (Stanley Associates Engineering 1990; Snowy Mountain Consulting 1992). Despite the 1992 assessment that inter-basin transfers from the Melamchi River to the Kathmandu Valley could go forward as envisioned in the earlier assessments, it would be another three years before any further concrete actions would take place to realize these plans

(ADB 1997; Paudel 2021). In the meantime, growth rates in the Kathmandu Valley remained high with notable drops in groundwater levels during the first half of the 1990s (Ishtiaque, Shrestha and Chhetri 2017).

The topic of diverting Melamchi River water to the Kathmandu Valley re-emerged in Nepal's political discourse in the run-up to the country's 1994 elections. Once again, Nepali Congress (NC) Party President, Krishna Prasad Bhattarai, made the promise of diverting Melamchi water to Kathmandu central to his internecine bid to unseat Prime Minister Koirala in the run-up to the general election later that year (Baral 1995; Poudel 2021). NC President Bhattarai was once again contesting his seat in Nepal's parliament from Kathmandu and, as in the previous election cycle, made improving urban infrastructure central to his campaign with water challenges, in particular, at the top of his list of priorities (Baral 1995; Poudel 2021). Bhattarai ultimately lost his party's nominating contest to Prime Minister Koirala, but Koirala would go on to lose the general election after several of Bhattarai's supporters within the NC withdrew their support for Koirala, accusing him of corruption (Baral 1995; Poudyal 1995). These allegations centered around another set of water policy issues that were of core concern to many NC supporters – namely, that Prime Minister Koirala had accepted personal kickbacks in exchange for agreeing to a river-sharing treaty with India that was widely viewed as highly unequal, allowing India to divert a disproportionate share of water from the Mahakali River along the boundary between the two countries (Poudyal 1995; Neupane 2015). In the end, Communist Party of Nepal-United Marxist-Leninist (CPN-UML) candidate Man Mohan Adhikari went on to take

the Prime Ministership, marking the first time in Nepal that a communist candidate won a nationwide general election (Poudyal 1995).

Despite political uncertainty that emerged the following year when Prime Minister Adhikari unsuccessfully dissolved parliament in a bid to retain his job, local officials in Kathmandu, the international donor community and the World Bank were all eager to move forward with augmenting the Kathmandu Valley's existing water supply, which was becoming increasingly insufficient to meet local household needs (ADB 1998; Interview 4/15/2018; Whittington et. al 2004). Once again a new team of international consultants was hired to assist with the planning process. The subsequent study that emerged on building tunnels to connect the Melamchi River to the Kathmandu Valley marked the first time that social scientists were involved directly in the planning process; the study also marked the first time that rural communities in the Melamchi Valley were surveyed and informed about the potential impacts of the project (ADB 1998; BPC Hydro Consult 1996; Khadka and Khanal 2008). The report indicated that roughly a dozen households on the Kathmandu side of the tunnels would need to be re-located and that project managers would need to provide compensation to some residents of Sundarijal (ADB 1998). The report further suggested measures including improving roads and infrastructure on the Melamchi Valley side of the tunnels and on implementing Social Upliftment Programs (SUPs) for residents directly impacted by the proposed construction (ADB; BPC Hydro Consult 1996).



Although the consulting team involved in drafting the report anticipated that the number of households and Village Development Committee (VDCs) directly affected by tunnel construction would be low, word soon spread throughout the surrounding area, prompting a rural backlash among those who demanded the government provide more resources to their own communities before diverting the area's water resources to Kathmandu (ADB 1998; BPC Hydro Consult 1996; Domench, March and Sauri 2013; Khadka and Khanal 2008). Opponents to the planned tunnels were not opposed to the river diversion *per se*, but rather were concerned that co-benefits of the project would not be shared with the communities in the area (Khadka and Khanal 2008). This is consistent with what Ramachandra Guha (1989; 2007) has described as “empty-belly environmentalism” or “environmentalism of the global South” in respective publications, emphasizing that residents of many rural communities, like the ones in the Melamchi Valley, are not necessarily opposed to large-scale development projects, in and of themselves, but rather are often driven to acts of protest and resistance when they perceive that the benefits of such projects will not be shared equitably. For instance, the lack of local hydropower development (as envisioned by the first pre-feasibility study) and the lack of a plan to improve existing irrigation infrastructure for Melamchi Valley farmers – 85% of whom were farming at the subsistence level at the time of project planning – would both become sources of tension between local residents and government planning authorities (Domench, March and Sauri 2013; Interview 4/23/2018; Interview 5/12/2018; Khadka and Khanal 2008). Limited engagement between project planners and engineers and

Melamchi Basin residents during subsequent periods of delays would further exacerbate these tensions in years to come.

*Structural Adjustments meet Maoist Movements: Political changes and the MWSP*

In the months immediately following the first study that directly informed Melamchi Valley residents of the proposed diversion tunnels, two concurrent trends were taking place: first international lending agencies were performing a review of existing technical studies to consider the conditions under which they would distribute funds for the MWSP, and second, Maoist rebels, commanded by a future prime minister of Nepal attacked a police post in a remote western district, declaring a People's War against Nepal's government (ADB 1998; Adhikari 2014). The initial Maoist attack had little impact on the day-to-day politics of the Kathmandu Valley where Nepali Congress (NC) Prime Minister, Sher Bahadur Deuba, had replaced Man Mohan Adhikari, the short-lived communist prime minister, the year before. Indeed the Maoist rebels had little access to firearms at the time, limited financial means, and were initially overrun by the very police officials whose headquarters they tried to conquer (Adhikari 2014). Nonetheless, the attack on police officials and state authorities was met with great deal of sympathy by a number of rural poor in the surrounding districts, many of whom had long resented Kathmandu elites and a national police force controlled by the center with a long and well-documented history of brutality (Adhikari 2014; Dahal 2016).

During the initial years after the Maoists declared their People's War against the state in February 1996, support for the movement was most strongly concentrated in rural western districts of Nepal far from Kathmandu and did not immediately affect planning for the MWSP. Both the World Bank and the Asian Development Bank (ADB) were involved in reviewing the earlier feasibility studies as they considered financing for the project. After Prime Minister Deuba's NC-led coalition requested financial assistance from both lending institutions in April 1996, a reconnaissance mission from the ADB expressed serious concern that the Kathmandu Valley's existing water distribution system management needed significant improvement before the bank would consider any further financing (ADB 1998). World Bank representatives expressed similar concerns, focusing in particular on financing for earlier water treatment and distribution projects from the 1970s and 1980s that had never been brought online (ADB 1998; World Bank 2000). The Deuba-led national government ultimately agreed to introduce private sector management of urban water supplies in the Kathmandu Valley (ADB 1998; World Bank 2000). These proposed neoliberal reforms of the water sector were consistent with policies propagated by international lending institutions throughout much of the world during the 1990s (Bakker 2003; Bakker 2007; Swyngedouw 2004) At a time when many of the former Warsaw Pact countries had already undergone shock therapy, India was gradually dismantling its permit *raj*, and structural adjustment programs (SAPs) were being implemented across Latin America and Africa, Nepal's own proposed urban water

sector reforms were relatively modest in comparison, and well in-line with neoliberal policies being pushed and promoted elsewhere.

At the same time, the NC-led coalition headed by Prime Minister Deuba suffered enormous losses in local-level elections across much of Nepal, marking the first time in Nepal's history of democracy that the country's oldest democratic party won less than 30% of the vote (Dahal 1999). For most of the country's poor and rural populations, the NC was no longer perceived as a party that worked to promote the interests the less economically accomplished. Populist politicians, both within Nepal's established communist parties and among the former autocratic Panchayat leaders of the RPP, sought to portray the NC leadership as out-of-touch urban elites who were ultimately corrupted by the Government of India (Dahal 1999; Khanal and Hachethu 1999). Deuba's own government was soon replaced by a coalition government between the Communist Party of Nepal-United Marxist-Leninist (CPN-UPL) and the party of the former Panchayat autocrats, the RPP (*Rastriya Prajatantra Party*) (Dahal 1999). The rule of this unholy alliance, between a party that officially espoused Marxism as its guiding philosophy and a far-right party whose putative policy goals centered around strengthening the power and glory of the king, coincided with rising political support for the Maoists across rural Nepal (Adhikari 2014; Dahal 1999; Khanal and Hachethu 1999). The Maoists had boycotted the 1997 elections altogether, dismissing the CPN-UML as a bourgeois party, falsely carrying the flag of socialism only to further the goals of a small cadre of corrupt elites (Adhikari 2014; Dahal 1999). While the Maoists drew little sympathy or popular support from urban

residents of the Kathmandu Valley, it was during the years of the alliance between the CPN-UML and the RPP that the Maoist leaders were successful in expanding their base of support beyond a small number of especially remote districts in Nepal's middle- and far west across a much wider swathe of the Nepalese countryside (Adhikari 2014; Dahal 1999; Paudel 2016).

At the time of the alliance between the CPN-UML and the RPP, which lasted from 1997 to 1999, the district of Sindhupalchok – where the Melamchi Valley is located – had not yet become a Maoist stronghold, yet frustration with political and economic elites ran deep among the rural population (Adhikari 2014; Domench, March and Sauri 2013; Interview 5/23/2018; Khadka and Khanal 2008). Addressing rural concerns about the MWSP began to occupy a more prominent place in the reports conducted by foreign consultants during this time period than they had in earlier technical studies and EIAs (ADB 1998; ADB 2000; Domench, March and Sauri 2013; Khadka and Khanal 2008). Though a 1996 study had identified seven Village Development Committees (VDCs) whose jurisdictions would be impacted by tunnel construction, later reports identified 17 such VDCs, largely in response to widespread demands from the surrounding communities that Melamchi Valley residents share in the benefits of the project (ADB 1998; ADB 2000; Hydro Consul 1996; Khadka and Khanal 2008). A 1998 report published by the ADB recommended hiring full-time foreign and domestic NGO coordinators, hygiene educators and sociologists during the initial stages of the projects to address social challenges in the Melamchi Valley raised by community representatives (ADB 1998). Nonetheless, many residents of

Melamchi Valley villages voiced concerns that the framework for engaging their communities was implemented in a top-down manner, and that there was no organized or systematic process through which Melamchi residents could communicate with project officials or make their concerns heard to government engineers or planners (March, Domench and Sauri 2013; Interview 5/23/2018; Interview 11/27/2018; Interview 11/29/2018; Khadha and Khanal 2008).

One of the main concerns voiced by residents of the Melamchi Valley regarding the early implementation of the MWSP centered around what many residents viewed as a lack of procedural justice in being able to contribute their voices to the planning process (Interview 5/23/2018; Interview 11/27/2018; Interview 11/29/2018).

Zwartveen and Boelens (2014) specifically list procedural fairness as one of the core pillars of water justice, drawing on a wider body of political ecology and environmental justice (EJ) scholarship that emphasizes the need for an ethics-based autonomy in decision-making, emphasizing the agency of all people and communities involved in a particular project (Bakker 2007; Boelens 2014; Domench, March and Sauri 2013; Shrestha, Joshi and Roth 2020). Such fairness requires more than simply ensuring the equitable distribution of benefits or resources. Rather this approach stresses the agency of the communities and people involved and impacted by large-scale water projects, requiring a broader and more inclusive definition of who constitutes a stakeholder – one that isn't merely focused on economic and political elites (Shrestha, Joshi and Roth 2020; Zwartveen and Boelens 2014). Such concerns were a core part of the resistance raised by many community representatives living in

VDCs in the broader Melamchi Valley. Few people, if any, opposed the project outright – and indeed most Melamchi Valley households had multiple family members living in Kathmandu – rather the most common concerns voiced by Melamchi residents involved concerns about not having a voice in a process where all the benefits would ultimately go to residents on the other side of the tunnels (Interview 5/23/2018; Interview 11/26/2018; Interview 11/28/2018; Pokharel 2005).

A later environmental impact assessment (EIA), conducted in the second half of 1999 and published by the ADB in 2000, provided a more detailed assessment of social initiatives the ADB wanted to tie to the MWSP. This EIA was the first to provide a framework for potential Social Upliftment Programs (SUPs) to be conducted in the Melamchi Valley, along with what the ADB viewed as challenges specific to the region (ADB 2000). The EIA made multiple suggestions ranging from the benefits of improved transportation links to Kathmandu, to strategies for strengthening longstanding community forestry groups, to reducing human trafficking out of the district, which at that time had one of the highest rates of human trafficking in South Asia (ADB 2000). Few specific details were included as to how the construction of the Melamchi tunnels would possibly address the challenges of human trafficking beyond a vague statement that improved road connectivity would allow farmers more opportunities to sell crops in urban markets, increasing incomes and thus alleviating some of the ‘push’ factors that had allowed trafficking networks to flourish in the first place (ADB 2000; World Bank 2001). Other issues raised by representatives of Melamchi Valley VDCs, such as upgrading irrigation infrastructure for local farmers,

building a hydro-power plant to address perennial electricity shortages, and extending the proposed tunnel access road to serve more residential communities were not fully addressed, save for a clause that increased electricity production could be available in the future – just not through local hydropower generation (ADB 2000; Domench, March and Sauri 2013; Interview 5/23/2018 Khadka and Khanal 2008).

Some of the most promising proposals for the Melamchi Valley VDCs detailed in the 2000 EIA were rooted in community institutions that had already long existed before foreign engineers and consultants had begun arriving in the area to perform technical studies. For instance, at the time of the report there were 67 areas across the Melamchi Valley, designated as community forests and managed collectively in accordance with longstanding social practices and traditions native to the ethnic groups of the valley (ADB 2000; Pokharel 2005). Many of these forests are located along the upper portions of the slopes of the Melamchi Valley in the protected buffer zone of Langtang National Park before transitioning to alpine meadows, which are used for seasonal grazing among members of the Tamang and Hyolmo ethnic communities (ADB 2000; Interview 11/26/2018; Interview 11/28/2018; Pokharel 2005). The initial ADB EIA suggests making resources available for protecting the longstanding traditions of community forestry management – something the Government of Nepal had already begun doing in the years leading up to the publication of the 2000 report. Below the village Timbu, located roughly parallel to the site of the Melamchi tunnels, most tracts of previously forested lands have been clear-cut with those that remain growing only on steep slopes. Because of the steeper



slopes surrounding the tunneling site and further upstream, however, clear-cutting is much more limited and many forested slopes continue to provide basic household needs for residents such as fodder and cooking fuel (Interview 11/26/2018' Interview 11/27/2018; Interview 12/1/2018; Pokharel 2005). The 2000 report makes mention of proposals to support the government's efforts to provide funding for community forestry, though as of 2018-19 little reforestation has taken place in the Melamchi Valley's lower reaches.

Some of the more severe social dispossession associated with the construction of MWSP infrastructure was to occur on the Kathmandu Valley side of the tunnels in the area around Sundarijal. The preliminary EIA from 1990, along with the more detailed EIA from 2000 published by the ADB, both indicate that two dozen existing households located near Sundarijal in the Kathmandu Valley would need to be re-settled to make room for a water treatment plant and pipelines connecting the Melamchi tunnels to a bulk distribution system that would move water further into the city of Kathmandu (ADB 2000; Stanley Associates Engineering 1990). Much of the land around the Kathmandu Valley tunnel exits was and remains rural to this day, although both of the EIAs mention the need to include compensation for homeowners whose structures would need to be destroyed to build the infrastructure to bring Melamchi water to the city. During the fieldwork I conducted between 2017 and 2019 I was unable to uncover much detailed information about how this re-settlement process ultimately unfolded. One official tried to assure me early in the research that the impacts were small and that everyone was compensated fairly (Interview

10/27/2017). A close contact of a friend later mentioned to me that she had grown up near Sundarijal and that the people who had moved were “mostly small farmers”, but that beyond that she had little information about where they were now or about the terms and conditions of their resettlement (Interview 9/30/2018). Other present-day residents of Sundarijal commented that their livelihoods and infrastructure in the community had improved noticeably in recent years, due in part to an increase in visitors to the nearby Shivapuri National Park, though these respondents lived further from the tunnels and had not been impacted directly by their construction, which by that point had begun more than a decade earlier (Interview 10/30/2017; Interview 10/01/2018).

In the years coinciding with the publication of the ADB report, and the more detailed EIA, a number of political changes and challenges led to the delay and eventual restructuring of the terms and conditions of the MWSP. After the fragile coalition between the Communist Party of Nepal-United Marxist-Leninist (CPN-UML) and the right-wing RPP collapsed in 1999, Nepali Congress (NC) Party leader Krishna Prasad Bhattarai – who had previously served as first prime minister during the 1990 transition to democracy – once again ran for the post of prime minister and once again promised to bring Melamchi water to Kathmandu in such quantities that it would wash clean every street in town (Poudel 2021). This time around Bhattarai’s NC Party not only won a majority of seats, but Bhattarai himself managed to survive his party’s own internecine power struggles, taking the top leadership post for a second stint (Adhikari 2014; Dahal 2016). Despite Bhattarai’s campaign promises to

place the Melamchi Project front and center among his policy priorities, the parliament was quickly consumed with how to respond to the Maoists' rebellion, which had come to overshadow all other aspects of political life in Nepal. The Maoist leaders had boycotted the elections, as they had in the previous cycle. The Maoists further claimed that all the parliamentary parties were inherently bourgeois, irrespective of their underlying ideology, and that the only way to break the cycle of oppression and ensure the dictatorship of the proletariat was through a *Jana Yuddha*, or People's War (Adhikari 2014; Interview 4/15/2018).

One of the strategies that enabled support for the Maoists to spread quickly across rural Nepal was the movement's leaders' ability to transcend simple rhetoric of class struggle and appeal to various rural populations on the basis of cultural identity (Adhikari 2014; Paudel 2016). Paudel (2016: 548-549) describes how issues of ethnic domination and marginalization were central to the appeals of Nepal's Maoists, and that unlike many communist movements elsewhere in the world, "Nepali Maoists understood the cultural dimensions of social hierarchies and successfully incorporated them into the revolutionary philosophy and practices". By the year 2000 support for the Maoists had spread far beyond the western hilly districts where the movement originated, reaching a major turning point with the enrollment of large numbers of Madheshi peoples from the flat, swampy Terai plains into the Maoist coalition (Adhikari 2014; Paudel 2016). Many ethnic groups native to the region straddling the Indo-Nepalese border, known as the Terai in Nepal, have been exploited historically by larger kingdoms and empires to their south and north (Fujikura 2014; Neupane

2015). The Tharu people of the western Terai, for instance, had mostly served as *kamaiyas*, or indentured laborers, born into a life of inherited debt bondage, until their alliance with the Maoists enabled them to break free from their historical masters in 2000, allowing them freedom of movement and the ability to engage in political protest (Fujikura 2014; Paudel 2016). Even less restricted groups from the Terai have felt historically peripheral to the regimes both in Kathmandu and Delhi, with members of the same family or clan on opposite sides of the border required to use different second languages from one another (Nepali or Hindi) rather than use their own native tongue at school or work (Tharu, Bhojpuri, Maithila etc). Given the historical feelings of marginalization of many groups native to the Terai, and given that nearly half of Nepal's population lives there, the Maoists' ability to enroll these citizens into their own coalition would have profoundly transformative impacts on Nepal's politics as a whole.

Despite the proliferation of support for the Maoist movement across a wide swath of Nepal's land area, the Kathmandu Valley remained one of the regions of the country where the Maoist leaders carried the least influence. Throughout the period that the Maoists were engaging in their *Jana Yuddha* or People's War, the Kathmandu Valley's population continued to burgeon, this time driven largely by wealthy landed elites who were fleeing the countryside to escape perceived threats of being executed and having their land re-distributed by Maoist rebels (Interview 8/15/2018). Meanwhile, the World Bank, in partnership with the Government of Nepal, was already in the process of bidding for tenders for a private firm to manage the Kathmandu Valley's

urban water systems as part of the structural reform agreement made to secure financing for the MWSP (Domench, March and Sauri 2013; Khadka and Khanal 2008; Rest 2018; World Bank 2001). The ADB had just approved a loan of \$120 million to finance initial construction efforts, but this was only a fraction of the project cost estimated at \$464 million (ADB 2010). The escalating political violence across much of rural Nepal, coupled with the Maoist leaders' deliberate targeting of government-sponsored infrastructure projects backed by foreign capital, confounded World Bank efforts to find a private firm willing to enter into contract to manage the Kathmandu Valley's water supply. Although the political leadership continued to try to move forward with initiating construction on the Melamchi tunnels, that process was soon delayed further by tragic and unforeseen political events right in the Kathmandu Valley.

Although the Maoists' *Jana Yuddha*, or People's War had already been raging for five years across much of Nepal's countryside, the events of 2001 would radically re-configure the calculus for actors across Nepal's political spectrum. Throughout much of the first five years of the People's War, King Birendra had played a more limited role than some of his predecessors in the country's day-to-day politics, leaving much of the practical decision-making to parliament and the prime minister. Then, on June 1, 2001, King Birendra, his wife, Queen Aishwarya, and seven other members of the royal family were shot to death in a massacre at a banquet dinner, while Crown Prince Dipendra slipped into a coma from a self-inflicted gunshot wound (Chester 2011; Magistad 2001). Multiple first-hand accounts of the assassination of King Birendra

and Queen Aishwarya at the hands of their own son confirm that Crown Prince Dipendra had been upset that his parents refused to approve of the woman he wanted to marry and had committed the mass shooting of his family with a series of pistols and a military assault rifle before turning the gun on himself and pulling the trigger (Magistad 2001). In accordance with the traditions of royal succession in Nepal at the time, Crown Prince Dipendra was formally named as the new king while comatose before succumbing to his injuries three days later. Upon Dipendra's death, the late King Birendra's younger brother, Gyanendra, who had been away from Kathmandu at the time of the shooting, assumed the throne.

In the hours and days immediately following the royal massacre, rumors and conspiracy theories proliferated like wildfire, as grief, mourning, shock and uncertainty spread quickly across Kathmandu, and soon across the country as a whole (Interview 4/17/2018; Magistad 2001). The initial uncertainty surrounding what had transpired at the Narayanhity Palace of Kathmandu was compounded in the early days following the shooting by statements from soon-to-be King Gyanendra – then formally serving as regent while Dipendra was still alive but comatose – that suggested the deaths were the result of the accidental discharge of an automatic weapon (BBC News 6/2/2001; Interview 4/17/2018; Mullins 2011). Even though the Maoists had been in the midst of their People's War at the time, the late King Birendra and his son Dipendra had remained popular among much of the general population, partly because of their hands-off approach to Nepal's parliamentary politics in the years following the collapse of the Panchayat system (Mullins

2011). Much of the Maoists' strongest vitriol in the years immediately leading up to the royal massacre was directed more strongly at the failure of parliament and leaders of the political parties to ensure that the benefits of the earlier *Jana Andolan*, or People's Movement, were shared by citizens beyond the Kathmandu Valley's political and economic elites (Adhikari 2014; Mullins 2011). The belief among more religious segments of the population that the monarchy occupied a prominent place within Hindu cosmology contributed further to a sense of existential despair and the proliferation of rumors, especially after the official account of what had happened at the palace changed over the days immediately following the shooting (Butler 2016; Mullins 2011).

By the time the results of a more thorough official investigation had been released, naming then-Crown Prince Dipendra as the assassin behind the royal massacre, a number of competing explanations were circulating widely throughout Nepal. Many of these explanations centered around the premise that Dipendra was not culpable for massacre, with many people in Nepal speculating that Gyanendra – who assumed the throne upon Dipendra's death – was involved in plotting the shooting (BBC News 6/3/2001; BBC News 6/27/2001; Mullins 2011). The fact that Gyanendra's own accession to the throne was only possible through the simultaneous deaths of his elder brother, King Birendra, and two of his nephews, Dipendra and Nirajan, combined with the fact that Gyanendra's own wife, son and daughter had all escaped unharmed further buttressed suspicions that he had a role in the massacre. Gyanendra himself was in Pokhara, roughly 200 kilometers away, at the time of the massacre, but his

wife and children were in a different room of the royal palace in Kathmandu when the shooting took place (BBC News 6/27/2001; Mullins 2011). Moreover, Gyanendra and his son Paras were unpopular even before the massacre, with both being perceived as far more interested in politics and the acquisition of wealth than either the late Birendra or Dipendra were (Mullins 2011). Explanations ascribing culpability to Gyanendra and Paras circulated alongside wilder conspiracy theories, including that they had poisoned Kathmandu's water supply or that 900 people had been killed in the shooting (Hutt 2016). Despite this, a number of army and security officials who had been at the palace that night verified the same factual details independently of one another, ascribing responsibility for the shooting to none other than Crown Prince Dipendra (BBC News 6/27/2001; Mullins 2011).

The royal massacre also profoundly re-configured the relationships between the Maoist movement, the Nepalese state and international lending organizations, irreversibly altering Nepal's politics and the trajectory that the MWSP would take. In the days following the shooting Maoist leader and future prime minister of Nepal, Pushpa Kamal Dahal aka Prachanda<sup>14</sup>, claimed that the massacre had been orchestrated by foreign imperial forces, suggesting that the Central Intelligence Agency (CIA) of the United States and the Research and Analysis Wing (RAW) of India's Intelligence Agency had been colluding to overthrow King Birendra and

---

14 During the early days of the People's War, the identity of Maoist leader Prachanda, which means 'fierce one', was unknown to most government authorities. Prachanda was later identified as Puhspa Kamal Dahal, whose name literally means 'serene lotus flower' and spent most of the conflict era commanding Maoist troops while in hiding in India.



install Gyanendra in his place in order to carry out their own colonial agenda in Nepal (Hutt 2016; Times of India 6/1/2011). While representatives of the Indian Embassy and the US Embassy in Kathmandu had already made public their support for the efforts of the Government of Nepal to contain the Maoist uprising, later analyses suggest that Prachanda's efforts were focused mostly on consolidating existing support for his political movement at a time when there was a sudden, and unexpected, outpouring of support for the institution of the monarchy (Interview 4/18/2018; Times of India 6/1/2011). Whatever additional goodwill toward the monarchy was generated in the aftermath of the royal massacre, however, would prove to be short-lived. In the months immediately following King Gyanendra's coronation, the new monarch attempted to consolidate power and re-assert absolute control over Nepal's politics, eventually strengthening the hand of the Maoists and delaying the implementation of large-scale development projects backed by the international community.

The year after the royal massacre was marked by the withdrawal of the World Bank from supporting the MWSP, the declaration of a state of emergency to deal with escalating political violence, and the dissolution of parliament later followed by an effort by King Gyanendra to suspend parliament indefinitely out of apparent frustration with the political parties (Interview 4/18/2018; World Bank 2003). After the Government of Nepal had agreed to implement the structural reforms of the water sector necessary to obtain a World Bank loan, there were ongoing efforts to attract a private firm to manage the Kathmandu Valley's urban water distribution systems

(ADB 2010; Rest 2018). The uncertainty caused by the Maoist rebellion, which by then was targeting government-sponsored infrastructure projects across the Nepalese countryside, coupled with the further uncertainty caused by the royal massacre caused several potential firms that were exploring investments in the Kathmandu Valley's water sector ultimately to pull out (Interview 4/18/2018). Though the governments of Sweden and Norway eventually stepped in to provide some additional financial and technical support through their own overseas development agencies (SIDA and NORAD), the future of bringing Melamchi water to Kathmandu still looked uncertain and was compounded further by subsequent political developments that year (Domench, March and Sauri 2013; Khadka and Khanal 2008).

A state of emergency was first declared in Nepal six months after the June 2001 royal massacre to grant the army and security forces additional powers to combat escalating political violence associated with the Maoist rebellion. Initially the state of emergency saw cooperation and coordination between King Gyanendra, NC Prime Minister Sher Bahadur Deuba and foreign governments, including the USA, which provided the Nepal Army with \$20 million of weapons and tactical equipment in what was then viewed as an integral part of the George W. Bush administration's War on Terror policies (Kraemer 2003). The state of emergency in Nepal also granted army and police officials wartime powers to detain and launch offensives against Maoist combatants without the usual need for judicial oversight or peacetime protections of civil rights (Adhikari 2014; Kraemer 2003). After an estimated 3000 people affiliated with the Maoist movement were killed by state security forces during the first six

months of the national emergency, divisions had begun to emerge within the NC Party in parliament, forcing Prime Minister Deuba to ask the king to dissolve parliament and call for early elections. Leaders of the parliamentary parties remained deeply divided about how to address the ongoing violence. Suspected Maoist combatants were frequently detained as prisoners of war for longer than the three month period allowed under the state of emergency without any access to legal remedies, while numerous reports emerged of state security forces deliberately targeting and killing family members of combatants in acts of vengeance (Kathmandu Post 12/13/2019; Kathmandu Post 12/3/2020; Kraemer 2003). With the exit of the World Bank from Nepal's development landscape, and the level of violence accelerating the prospect of bringing Melamchi water to Kathmandu appeared more distant than ever.

By the time Nepal's parliament was dissolved in the middle of 2002 much of the Melamchi Valley itself had already come under control of the Maoist rebels, dashing any hopes among Kathmandu Valley elites that construction on the MWSP could begin anytime soon. Although the proximity of Kathmandu to Sindhupalchok District – where the Melamchi Valley is located – kept it from falling under Maoist control earlier on in the People's War, the fact that Sindhupalchok remained one of the more economically marginalized districts in the country at the time left many local residents sympathetic to the Maoists' ideology (Aase, Chapagain and Dangal 2019; Interview 11/26/2018; Interview 11/28/2018; Pokharel 2005). During the latter years of the People's War, supporters of the Maoist movement strove to enact a 'cultural

revolution' of sorts in several of the Melamchi Valley VDCs in an effort to suppress symbols and institutions they saw as being responsible for promoting a repressive form of upper-caste Hindu hegemony (Aase, Chapagain and Dangal 2019; Interview 11/28/2018). For that reason, local schools were burned to the ground in several places, such as in the village of Sermathang in the Melamchi Valley's upper reaches, while school teachers were threatened with execution (and in some cases killed) for their supposed role in propagating oppressive state ideology (Adhikari 2014; Aase, Chapagain and Dangal 2019). During this time a large number of families from the Melamchi Valley relocated to Kathmandu to enable their children to continue pursuing an education in a trend that would re-configure the social relations of Melamchi Valley households and families into the present-day.

Nearly five months after King Gyanendra had approved Prime Minister Deuba's request to dissolve parliament and hold early elections, Deuba requested another six month delay before elections were held, citing the poor security situation and ongoing disputes among the parliamentary parties (Adhikari 2014; Kraemer 2003). King Gyanendra reacted angrily to this request, publicly chastising Deuba as an incompetent fool and instead appointed a nine-member cabinet of loyalists headed by Lokendra Bahadur Chand – a well-known supporter of the monarchy – as an unelected prime minister (Kraemer 2003). Though this move was widely viewed as unconstitutional by international observers and by domestic opponents of the king, politicians of the existing parliamentary parties remained bitterly divided by their own internecine power struggles, while the Maoist rebels effectively controlled much

of the countryside, leaving many key leaders of the Nepal Army and other state security forces to back the will of the king (Adhikari 2014; Kraemer 2003). Over the following two-and-a half years King Gyanendra would subsequently hire and dismiss three prime ministers of his own choosing, including bringing back Sher Bahadur Deuba for another stint, each time ostensibly dismissing them for the reason of refusing to hold timely elections. In the meantime, the Maoists continued to control most rural districts in the country, although the level of violence had stabilized somewhat from the heavy spike in bloodshed seen during the initial period of the national emergency in 2001-2002. Throughout this period much of the Melamchi Valley would remain under the effective control of the Maoists and their sympathizers (Interview 11/28/2018).

A second stint for Sher Bahadur Deuba as Nepal's appointed prime minister during the Maoist rebellion ended in a similar manner to the elected term Deuba had served just a few years earlier. On February 1, 2005 King Gyanendra declared a renewed state of emergency, once again dismissing Deuba in a purported effort to end the insurgency by seizing absolute power and excluding the political parties, which he viewed as weak and divided, from participating in the decision-making process (Lawoti and Pahadi 2010). Proclaiming, "democracy and progress contradict one another" Gyanendra banned all news reports of the conflict with immediate effect, cut telephone and internet connections across the country, and directed the army to arrest senior parliamentary leaders, civil society representatives, journalists and trade union leaders (Lawoti and Pahadi 2010; Nepal Commission on Human Rights 2017). In

response, the governments of India and the United Kingdom, which had been providing financial support to the Nepalese state immediately ceased their funding. The United States initially remained silent, while representatives of the People's Republic of China responded by quickly dispatching arms, tactical equipment and increased financial support to Nepal's state security forces, despite the Maoists' putative ideological affinity with the Chinese Communist Party (CCP) (Adhikari 2014; Lawoti and Pahadi 2010). Though the CCP's support for King Gyanendra and the Nepal Army during the second national emergency was hardly the first time the Chinese state intervened to support a neighboring country that historically had enjoyed much closer relations with the Government of India, it would mark the beginning of an escalating trend toward forging closer diplomatic, economic and military ties with Nepalese political leaders at particular junctures in Nepal's history when relations with India and the West were especially strained (Mulmi 2021).

King Gyanendra's decision to declare a new state of emergency not only to fight the Maoist insurgency, but also to detain and arrest leaders of the parliamentary parties that had hitherto opposed the Maoist rebellion would eventually compel leaders of seven of the largest parliamentary parties to unite in opposition to King Gyanendra. Moreover, while the Chinese government continued to provide weapons and military support to the king's security forces, a much larger number of foreign governments and international lenders and donors began to withdraw loans and aid to Nepal in response to King Gyanendra's behavior (Adhikari 2014; Domench, March and Sauri 2013). The overseas development agencies of Sweden and Norway, SIDA and

NORAD, which had offered some support for the MWSP after the World Bank's earlier withdrawal, canceled their involvement in the project in response to human rights concerns (ADB 2010; Domench, March and Sauri 2013). Regardless of the involvement of the international community, the level of violence between state security forces and Maoist insurgents, coupled with vandalism and bombings of government-sponsored infrastructure projects in Maoist-held rural areas, precluded construction from moving forward even for projects where funding had already been secured and disbursed. In response to this unprecedented level of violence and to the king's power grab, seven of the largest political parties, which collectively had represented 194 of the 205 seats in the most recent democratically-elected parliament banded together to press for a role in ending the civil war (Lawoti and Pahari 2010).

In the initial months after the formation of the Seven Party Alliance (SPA) widespread violence continued between state security forces and Maoist insurgents. By September 2005, however, Maoist leadership declared a three-month unilateral ceasefire in an effort to woo the support of the SPA in their shared opposition to King Gyanendra's autocratic rule (Adhikari 2014; Lawoti and Pahari 2010). Leaders of the parliamentary parties were initially skeptical of this offer, but after more than two months without any major Maoist-led attacks they ultimately agreed to negotiations brokered by India. In a statement released in late November, 2005 Maoist leaders and the SPA released a 12-point resolution describing absolute, autocratic monarchy as the primary impediment to "democracy, peace, prosperity, social upliftment, and an independent and sovereign Nepal" (Nepali Times 11/25/2005). The statement

included further commitments to plan for democratic elections to be held and for the Maoists to refrain from political violence and respect the democratic process (Lawoti and Pahari 2010; Nepali Times 11/25/2005). In the months that followed political violence began to decline sharply, while an increasing number of the *bandh* (general strikes) and protests that did take place focused on demands for new elections to be held and for the monarchy to relinquish its grip on absolute power over the political life of Nepal (Lawoti and Pahari 2010).

The following year the parliament was eventually restored after weeks of *bandh*, or general strikes shut down the Kathmandu Valley almost entirely. In response to mushrooming pro-democracy protests at the door of the royal palace, King Gyanendra implemented a curfew ordering security forces to shoot any and all violators on site (Gurubacharya 2006). This led to even-larger crowds staying out all night, ultimately shutting down all motor vehicle traffic across the Kathmandu Valley for more than three weeks. Initial demands to allow the SPA to share governance with the king were rejected, both by the Maoists and by SPA leaders themselves. Finally after several weeks of a complete, nationwide shutdown, King Gyanendra finally agreed to reinstate the parliament, eventually resulting in the cabinet resuming official business and removing its designation of the Maoists as a terrorist group (Gurubacharya 2006). Later that year the government and the Maoist leadership came to a mutual agreement to allow the United Nations (UN) to oversee a peace process between the two groups and allow UN inspectors to manage arms control between the Maoists and state security forces (Lawoti and Pahari 2010). Finally on November 21,



2006, the Seven Party Alliance and the Maoist leadership signed a comprehensive peace agreement brokered by the UN, formally ending the civil war in Nepal (Adhikari 2014; Lawoti and Pahari 2010).

*Peace, Democracy, Earthquake and the Diversion of Melamchi Water*

Although the completion of the peace process had the immediate effect of reducing the violence and the bloodshed that much of Nepal had been experiencing, resuming construction on large-scale infrastructure projects was a slower, more arduous process given how much of the financing for such initiatives had evaporated during the conflict era. Having already provided an initial loan for \$120 million of financing toward MWSP construction, the Asian Development Bank (ADB) re-emerged as one of the original lending organizations to continue backing the project once the peace agreement had been put into effect (ADB 2010; Khadka and Khanal 2008). By the time the peace process had concluded the population of the Kathmandu Valley had more than doubled since the initial pre-feasibility studies and environmental impact assessments (EIAs) were conducted, while the original projected date for bringing Melamchi River water to the Kathmandu Valley was already nearly ten years past (ADB 2010; Binnie and Associates 1988; Khadka and Khanal 2008; Rest 2018).

During the time that had elapsed since the initial consulting reports were produced the built-up urban area of the Kathmandu Valley had also more than doubled in area, while the groundwater table had dropped by several meters in some place experiencing the most severe conditions of overdraft (Chinnaswamy and Shrestha 2019; Ishitaque, Shrestha and Chhetri 2017). To address these concerns expeditiously,

the Seven Party Alliance (SPA) in parliament awarded the management of the Kathmandu Valley's urban water supply systems to a British firm, while the peace process was still being finalized between the UN, parliament and the Maoists (ADB 2010; Domench, March and Sauri 2013). The SPA also made several further efforts concomitant with the peace process to accelerate the tendering process for Melamchi construction bids, given the lengthy delays that had occurred as a result of the conflict.

The initial plans to allow a private, UK-based firm to manage the Kathmandu Valley's urban water distribution system hit a major snag the following year when the Maoists entered mainstream politics in Nepal. In January 2007 the Maoists, under the name CPN-M (Communist Party of Nepal-Maoists), joined political leaders of the SPA in an interim parliament of 330 members – up from the 205 who had been seated in the previous elected parliament (Lawoti and Pahari 2010; UNHCR 2009). At the same time the interim parliament was meeting, a number of newly revived civil society organizations (CSOs) had begun organizing against awarding the management of Kathmandu's urban water system to the UK-firm named the previous year, due to concerns that the firm in question had implemented steep hikes in water tariff rates in other countries where it had been awarded contracts (Consumer Rights Protection Forum 2007; Domench, March and Sauri 2013; NGO Federation Nepal 2007). A number of Nepal-based NGOs litigated the contract award in the Supreme Court of Nepal, and while the effort ultimately failed to nullify the contract through the litigation process, their efforts did manage to attract the attention of a number of

political leaders in Nepal, including members of the CPN-M who had previously railed against the influence of foreign capital in shaping how large-scale domestic infrastructure projects were implemented (Domench, March and Sauri 2013; NGO Federation of Nepal 2007)

By August 2007 the interim parliament of Nepal had canceled the ongoing tendering processes related to the MWSP due to strong opposition from members of the CPN-M in an unexpected reversal of the privatization process (Domench, March and Sauri 2013; Rest 2019). Though other examples of resistance to privatization of urban water systems abound within the academic literature – such as the Cochabamba water wars in Bolivia or protests against European firms in the management of Lagos, Nigeria’s water supply – many of the more notable cases involve opposition to water systems that are already under the control of private firms, with disastrous consequences for the urban poor (Bakker 2007; Goodwin 2018; Swyngedouw 2005; Swyngedouw 2012). What distinguishes the Kathmandu case from many other examples of opposition movements to privatization is in how a conjuncture of socio-political forces enabled policy-makers in Nepal to re-configure the terms and conditions of a large-scale infrastructure project backed by international lenders, after initial loans and contracts were awarded, but before the project was actually implemented fully. Proponents of privatization certainly also have cases to highlight, such as Manila’s expansion of service delivery without steep price hikes, which occurred after the award of a contract to the firm Maynilad Water Services (Lee 2020; Wu 2008). Nonetheless, the implementation of the MWSP stands out from these other cases from

this time period in the degree to which it represents a national legislature of what international lending organizations classify as a least developed country (LDC) refusing to adopt neoliberal orthodoxies (see Bakker 2013; Goodwin 2018; Swyngedouw 2012) and still ultimately being awarded loans for large-scale infrastructure projects (ADB 2010; ADB 2013; World Bank 2020). More recently, however, China's Belt and Road Initiative (BRI) has redefined many of the so-called conditionalities associated with financing from international lending organizations in a resurgence of a state-centered, albeit authoritarian, model for international development projects (Mulmi 2021).

In response to the rise of the CPN-M in Nepal's politics and the delicate situation of the post-conflict moment, public sector institutional reforms were launched and a new operator was created to manage Kathmandu's urban water systems – the Kathmandu Upatyaka Khanepani Limited (KUKL). Although KUKL was formally based on the public-private partnership (PPP) model to attract continued funding from the Asian Development Bank (ADB), in practice, a controlling 80% stake of KUKL is co-owned between the Government of Nepal and the municipal governments that comprise the Kathmandu Valley, 5% is worker owned, while only a 15% stake of KUKL is privately held (ADB 2008; ADB 2010; Domench, March and Sauri 2013). Though earlier lending agreements made before the escalation of political violence in Nepal had included cost recovery provisions and water tariff reforms, many of these were revoked in the post-conflict period and replaced with water subsidies for the urban poor (ADB 2008; ADB 2010). Behind many of these policies was Hisila Yami

– a staunch anti-privatization activist and the only woman holding a cabinet-level position at the time – who became Minister of Physical Planning and Public Works when the CPN-M joined the interim parliament (Rest 2019). Yami was instrumental in opposing awarding control of Kathmandu’s urban water system to a private, foreign firm and became instrumental behind the push for subsidies to the poor.

Despite the interim parliament’s opposition to privatization and advocacy for the poor, the heavy cost of subsidizing Kathmandu’s urban water supply raised further equity concerns for many actors involved in rural development initiatives. NGOs and CSOs involved in such initiatives at the time estimated that roughly two-thirds of all national spending and investment in water infrastructure was taking place in the Kathmandu Valley, even though it was only home to one-tenth of the national population (Domench, March and Sauri 2013; NGO Federation Nepal 2007).

Moreover, the CPN-M ended up quitting the interim parliament several months after it had joined to focus full-time on advocating for the abolition of the monarchy altogether. Although the remaining parliamentarians who had once comprised the Seven Party Alliance (SPA) ultimately banded together with the Maoists to keep the peace, resulting in the formal abolition of the monarchy by the middle of 2008<sup>15</sup>,

---

15 On December 24, 2007 a bill was first introduced in parliament to amend the constitution to make Nepal a republic and King Gyanendra was given notice the monarchy would likely be abolished the following year. This came to fruition on May 28, 2008 when the constitutional amendment passed, removing all references to the monarchy and formally classifying Nepal as a republic. Gyanendra left the Narayanhity Palace in central Kathmandu two weeks later on June 11, 2008, but was given permission to continue living in Nagarjuna Palace in the hills of Kathmandu as a private citizen. Gyanendra remains one of the wealthiest citizens of Nepal, with a net worth estimated in the hundreds of millions of US dollars, owns several properties and hotels, and is the largest stakeholder in Nepal’s primary tobacco company.

many rural groups that had participated in the People's War continued to agitate for better living conditions and for ethnic autonomy from the central government (Lawoti and Pahari 2010; Paudel 2016). Rural groups in the Melamchi Valley continued to demand that they share in more of the benefits of the project, although their access to planners and engineers in decision-making roles remained limited during this time (Domench, March and Sauri 2013; Rest 2018). Frustrated with the status quo, citizens from villages in the Melamchi Valley blocked access to the local MWSP office further delaying the start of construction. Eventually, new construction contracts were awarded, and the protesters removed the barricades after an agreement to provide additional social benefits to four more VDCs administered through Social Upliftment Programs (SUPs). More than two decades after the original engineering studies were completed, construction on the Melamchi tunnels finally broke ground.

*Construction and democracy move forward ... and an earthquake*

Over the following several years both the construction of the Melamchi tunnels and the process of drafting a new constitution for Nepal continued to proceed slowly, but steadily, with many twists and turns along the way. A rotating cast of many of the same party leaders revolved through several key government positions through many more interim bodies and constitutional conventions, but widespread political violence and conflict had largely dissipated after the abolition of the monarchy. Maoist leader Prachandra, or “fierce one”, had evolved into a more mainstream political persona, this time using his birth name of Pushpa Kamal Dahal, while serving multiple short-lived stints as prime minister, interspersed by turns at the helm for leaders of the

Nepali Congress (NC) and Communist Party of Nepal-United Marxist-Leninist (CPN-UML) parties. Although the World Bank and Swedish and Norwegian development agencies had withdrawn permanently during the conflict era, the ADB ended up providing additional financing for MWSP construction, while Japan's overseas development agency, JICA, also provided funding for the water treatment component of the project (ADB 2019; Interview 1/31/2018; Interview 2/3/2018; JICA 2018). And slowly, but surely, the Melamchi tunnels came ever closer to completion under the supervision of two successive foreign engineering firms. A tunneling firm that was a subsidiary of China's state-owned railways was initially awarded a contract, but this was later canceled and awarded to an Italian engineering and consulting cooperative after the former firm missed multiple deadlines set by the ADB and the Government of Nepal (ADB 2019; Rest 2019).

Just as the Melamchi tunnels were beginning to draw closer to completion, a 7.8 magnitude earthquake struck Nepal on April 25, 2015, causing widespread death and devastation. Most houses in the Melamchi Valley were destroyed, or severely damaged, as were older and lower-income areas of Kathmandu. The one mitigating factor was that the earthquake occurred at midday at a time of year when most farmers in the hardest-hit rural communities were out in the fields, with the earthquake roughly coinciding with the wheat harvest and the sowing of rain-fed, upland paddy in the Middle Hills of Nepal (Interview 5/23/2018; Nepal Department of Agriculture 2015; Parajuli and Kiyono 2015). Nonetheless, more than 8800 people died in Nepal alone, 3.5 million more were left homeless, while ancient buildings in

the Kathmandu Valley, such as Kathmandu's namesake *Kasthamandap* temple were destroyed (Nepal DRR 2015; Parajuli and Kiyono 2015). In the oldest urban areas of the Kathmandu Valley the flow of several ancient *hiti* water taps was disrupted, yet other *hiti* remained flowing, continuing to provide water to some neighborhoods where roads were blocked by debris (Interview 2/5/2018; Interview 5/18/2018). In the Melamchi Valley, several villages saw all their houses and structures either destroyed or severely damaged, while in Kathmandu city lower-income neighborhoods and historical structures were the most likely to have faced complete destruction. Many newer concrete and steel, rebar-enforced structures in the Kathmandu Valley, however, would suffer only minimal damage (Interview 2/5/2018; Nepal DRR 2015).

The Melamchi tunnels, which by that point spanned most of the distance between the two valleys, sustained longitudinal cracks, ring cracks, transverse cracks and inclined cracks along the inside surface, walls and crown (Shrestha et al 2020). Several of these cracks grew in scope after a series of aftershocks over the following month, including a 6.7 magnitude aftershock the following day and a 7.3 magnitude aftershock nearly three weeks later on May 12, 2015 (Shrestha et al 2020). Although the cracks in the tunnels would require repair work before regular construction could re-commence, the damage was relatively moderate and the overall structural integrity of the tunnels remained intact in the weeks immediately following the earthquake (ADB 2019; Rest 2019; Shrestha et al 2020). In the initial weeks following the earthquake and aftershocks the more total destruction of the Melamchi Valley villages played a more direct impact on construction delays than any damage to the tunnels



themselves. Indeed, Sindhupalchok District, where the Melamchi Valley is located, suffered some of the highest death tolls and most extensive property damage of any district in Nepal, even though the earthquake's epicenter was further west in Gorkha District (Parajuli and Kiyono 2015; Rest 2019). An estimated half of the Nepalese construction laborers working on the tunnels were from villages in Sindhupalchok District, while most of the rest were from other nearby districts that were also heavily impacted by the earthquake (Interview 5.23/2018a; Interview 5/23/2018b).

While the earthquake and its aftershocks caused severe damage to Melamchi Valley villages, and lesser damage to the partially-finished MWSP tunnels, a blockade and subsequent political crisis would exacerbate the region's suffering, leading to a protracted recovery and hundreds, if not thousands, of additional lives lost over the months that followed. After residents of the Melamchi Valley and Kathmandu alike spent the 2015 monsoon season largely camped out in the rain, further recovery from the earthquake was impeded after a blockade along the border with India prevented medicine, petroleum, natural gas, fruits and vegetables and construction materials from entering the country (Interview 10/17/2017; Interview 11/5/2017; Rest 2019). Nepal does not possess any petroleum or natural gas reserves within its own territory, and as of 2015 remained dependent on imports across the southern border with India for 100% of its non-biomass fuel needs (Interview 10/17/2017). Most pharmaceutical products consumed in Nepal are also imported from India, as is a large share of its construction materials, and many of the fruits and vegetables sold in cities and towns (Interview 10/17/2017; Interview 11/5/2017; Mehta 2015). Some

domestic production of cement and bricks does take place, but these industries are also currently reliant on fossil fuel imports from India to meet production needs (Interview 11/5/2017). Thus the 2015-16 blockade precipitated a massive humanitarian crisis that, by some accounts, led to more deaths than the earthquake itself, seriously delayed recovery from the earthquake and further progress on the MWSP, and ultimately pushed Nepal's political establishment much closer to Beijing (Gurung 2015; Interview 11/5/2017; Interview 4/15/2018; Interview 11/26/2018; Interview 11/28/2018; Mehta 2015; Mulmi 2021; Rest 2019).

The trigger for the blockade was the passage of the new (2015) Constitution of Nepal, which passed parliament on September 20 with 532 out of 598 votes (Constitution of Nepal 2015; Gurung 2015). Although the new constitution enjoyed widespread popular support among Nepal's major political parties, the constitution contained several clauses that prompted concern among prominent politicians in India, and among a smaller group of Madheshi activists in Nepal. During the constitutional convention, activists who had broken off from the Maoist movement several years earlier agitated for greater ethnic autonomy from Kathmandu. The ancestral claims of three such groups – the Tharus, the Madheshis, and the Kirati - overlapped, with some Madheshi activists claiming the whole of the Terai, stretching the entire breadth of Nepal from west to east as a proposed autonomous territory (Adhikari 2015; Madheshi Youth 2015). Concerns over adjudicating the ancestral claims of these three ethnic groups through the drafting of the constitution prompted the major political parties of Nepal to create new multi-ethnic provinces in an effort to avoid the

perception of favoritism of any one these competing claims (Adhikari 2015). Nonetheless, some Madheshi activists saw this as an effort to dilute their own political power by dividing the Terai districts along the Indian border into three separate provinces (Madheshi Youth 2015). These activists were backed vocally by elected district and state-level leaders on the Indian side of the border, many of whom share a common cultural and linguistic heritage with the Madheshis of Nepal (Rawat 2015; *The Indian Express* 9/24/2015). This transnational support for the Madheshi activists' demands, which resulted in a nearly six-month blockage of commercial shipments from India to Nepal, ignited and inflamed tensions across most of Nepal with lingering effects still being felt in Indo-Nepalese relations today.

The question of how directly India's central government in New Delhi was involved in planning and implementing the blockade remains fiercely contested; most Nepalis living in the hills directly blame Indian Prime Minister Narendra Modi for ordering the blockade to pressure Nepal to amend its constitution, while some sources outside of Nepal suggest the blockade's primary impetus was sparked by local-level actors along the Indo-Nepalese border (Arora 2015; Gurung 2015; Interview 10/17/2017; Interview 11/14/2017; Interview 12/3/2017; Rawat 2015). On the day the blockade began, the newspaper *The Indian Express* reported that there had been direct communication from New Delhi to Kathmandu about proposed changes to Nepal's constitution – a claim the Government of India vehemently denied (*Indian Express* 9/24/2015; Rawat 2015). Similarly *The Economic Times* reported that a supervisor with the Sashastra Seema Bal (SSB), India's border police force, claimed that the

SSB had been under orders from the central government to intercept all fuel shipments bound for Nepal during the first weeks of the blockade (Economic Times 10/20/2015). One area of broader agreement is that upcoming state-level elections in Bihar, India likely played a role in shaping discourses around the blockade, given the shared cultural heritage and strong trans-boundary ties between many Nepalese Madheshis and Biharis in India (Mehta 2015). The fact that Bihar voted for PM Modi's BJP Party in the general election for the first time in its history in 2014, and was considered pivotal to the BJP's electoral coalition, furthered suspicion in Nepal that Modi himself directly ordered the blockade in order to benefit the BJP's prospects in the Bihar elections (Gurung 2015; Interview 11/14/2017; Mehta 2015).

Irrespective of how extensively India's central government was involved in planning the blockade, the perception that Modi's government was personally responsible for the resulting humanitarian crisis in Nepal has shaped the course of Nepal's politics ever since. In the weeks following the closing of the Indian border to commercial traffic, fuel shortages caused motor vehicle traffic to grind to a halt, most construction activities were placed on hold and hospitals and doctors' offices across the country began reporting shortages of critical medical supplies. Intensive care units in Kathmandu Valley hospitals reported running out of high blood pressure medications, anesthesia, injectable antibiotics and hyperbaric oxygen (Kathmandu Post<sup>a</sup> 11/5/2015; Kathmandu Post<sup>b</sup> 11/5/2015; Khaled 2015). Vaccination programs across Nepal were put on hold for months, while many rural pharmacies and health posts closed altogether during the blockade, due to a lack of supplies (Kathmandu Post<sup>c</sup> 11/5/2015;

Khaled 2015). In response to the lack of available medical treatment, UNICEF put out a statement on November 30, 2015 warning, “More than 3 million children under the age of 5 in Nepal are at risk of death or disease during the harsh winter months due to a severe shortage of fuel, food, medicine and vaccines” (UNICEF 2015). Increases in pediatric death rates in Nepal during the winter of 2015-16 were most acute in higher-altitude regions affected by the earthquake where a lack of access to construction materials meant that families had to spend the winter outside without sufficient shelter for protection against the elements – the 2011 Nepal census indicates that only 4% of the population lives in what it defines as mountain regions<sup>16</sup>, yet roughly 1/3 of deaths of children under the age of five occurred here during the blockade-period winter of 2015-16 (Lama 2016; Nepal Census 2011; UNICEF 2016).

In response to the severe shortages of essential supplies in Nepal, the Chinese Communist Party (CCP) entered into a bilateral agreement with the Government of Nepal to allow the export of petroleum and gas from China to Nepal for the first time in history. The challenge, however, was that the primary motorable trans-Himalayan border crossing between the two countries remained blocked by a major landslide that had been triggered by the earthquake several months earlier (NDTV 2015; The Himalayan Times 12/11/2015). In the short-term the CCP arranged to have fuel and

---

16 The Nepal Census generally defines mountain regions as those where the median altitude is above 2500 meters. Some hilltops in the Middle Hills that may reach this height are still defined as the “hills” region if the surrounding terrain is lower. As of 2011, 50% of Nepal’s population lived in what the census defined as ‘plains’ districts, 46% in what the census defined as ‘hills’ and 4% in what the census defines as ‘mountains’.

medicine airlifted to Nepal as a donation (Gulf Times 12/11/2015; The Himalayan Times 12/11/2015). In the longer-term the governments of Nepal and China would enter into negotiations enabling Nepal to import more essential goods from China, while also allowing access to Chinese ports for the export of Nepalese goods to third countries (Interview 2/13/2019). Although the blockade along Nepal's southern border ended in February, 2016 after the introduction of a constitutional amendment to ensure proportionate representation of Madheshis in provincial assemblies, broader concerns about Nepal's dependence on India for such a wide range of goods persisted, prompting the pursuit of closer ties with China in the years that followed (Interview 2/13/2019; Mulmi 2021). The following national elections would be marked by bombastic anti-India rhetoric, while a later 2018 survey of 24 countries would name Nepal as the country with among the highest levels of public support and enthusiasm for China's Belt and Road Initiative (BRI) (QZ 11/18/2018; Telegraph Nepal 8/20/2020). Though Indian Prime Minister Modi's BJP would ultimately win the next elections in Bihar, helping to cement Modi's majoritarian rule, Nepal's historically close ties with India would profoundly shift toward its northern neighbor in the years to come (Mulmi 2021).

*Between past and future: waiting for Melamchi*

It was against this backdrop that I first began attempting to interview officials and planners involved in the MWSP. When I arrived in Nepal in January, 2017 to begin an affiliation with Tribhuvan University as an independent researcher, I encountered a cityscape that appeared radically different from the one I had remembered on visits to

Kathmandu five and seven years earlier. Much of the historic city center was still marked with piles of brick and rubble from the earthquake and subsequent blockade. Even New Road – one of central Kathmandu’s premier shopping streets, lined with jewelers, electronics shops and gold dealers – was a maze of high-end shops, collapsed buildings, intermittent street vendors and piles of bricks and dust jutting far out into the roadway in places. The blockade had only ended less than a year earlier at that point, and while construction laborers and equipment were ubiquitous on nearly every block of the city, it was evident there was still a lot of re-building left to be done. Over the next few years many of the more visible signs of the earthquake would gradually fade from the Kathmandu Valley’s residential and commercial neighborhoods, although restoration work remains ongoing at the time of writing at several heritage sites such as temples, palaces and monuments.

In addition to the rebuilding and restoration work associated with post-earthquake recovery, visible signs of the efforts to bring Melamchi water to Kathmandu were ubiquitous throughout core urban neighborhoods of Kathmandu and Lalitpur, the latter also home to the ancient *Manga hiti* of Patan that continues to supply daily household water through its 1500 year old system of underground canals and conduits. During the first few months of 2017 numerous roads, lanes, and narrow alleys were being torn up at any given point in time with dozens of workers laying new water mains beneath the pavement to supply MWSP water to residences and commercial plots of land. The MWSP contractors were easily distinguishable by the bright yellow and orange hard hats they wore while they worked – the hard hats being

something of a rarity among general construction laborers in Kathmandu at the time – which I would later learn was a condition of ADB financing that was monitored with periodic compliance checks by inspectors (ADB 2018; Interview 9/23/2017). The water mains themselves that were being installed were made from PVC material and imported from the United Arab Emirates (UAE) (Interview 9/23/2017). In some of the oldest, central neighborhoods of Kathmandu the new PVC piping was replacing older water mains that had been laid decades earlier, in some cases dating back to the Rana era, while in some of the newer residential areas along the Ring Road the PVC piping was the first publicly installed water infrastructure below the street level (Interview 9/23/2017; Interview 10/10/2017). Near the entrances to many houses, residential compounds and small commercial establishments smaller PVC piping was protruding vertically from small gaps in the ground surrounded by concrete. These smaller PVC pipes, I was informed, would eventually supply Melamchi water from the underground water mains to individual houses and businesses once the remaining tunneling and water treatment work was completed (Interview 9/23/2017; Interview 11/2/2017).

During the first few months of the interview-based portion of this research, which commenced in September 2017 after returning to California to advance to candidacy and after receiving IRB approval to conduct semi-structured interviews, I was able to meet with a couple local officials involved in the planning and implementation of bringing Melamchi water to Kathmandu and managing the valley's urban water



distribution system on a few occasions. During the first such interview, Ram<sup>17</sup>, an official with knowledge of the engineering and planning process expressed confidence that tangible benefits from the MWSP would be realized soon, stating, “in less than six months Melamchi water will come. Then the suffering of many people will be greatly relieved. The poor, too, will benefit especially. For they must spend the greatest effort collecting water” (Interview 9/24/2017). Such sentiment – that the arrival of Melamchi water was not only imminent, but equitable – was echoed widely within engineering and policy-making circles during those first months of this research. Sabin, a second official with knowledge of the planning process also proclaimed:

“We have waited a long time for Melamchi, and now Melamchi is almost here. If you are still here next year you will see the big improvement with our water. Come back in ten years and Kathmandu will be a very different place. Here there are many improvements. Only improvements. (Interview 10/14/2017).

Such optimism in imminent changes for the better was common place among research participants with knowledge of the engineering and planning process back in 2017. At the time, the conventional wisdom among members of the Kathmandu Valley’s more

---

17 In order to keep the identities of these research participants anonymous, I am using pseudonyms for all such respondents, and am refraining from identifying the specific job titles of public officials, given the relatively small numbers of planners and policy-makers involved in the MWSP and its related agencies. Moreover, I was unable to interview some of the core policy-makers in the most senior positions, making it more imperative to protect the identities of those who did participate in interviews.

privileged planning circles was that with the drilling of the Melamchi tunnels more than 97% complete and with the rapid pace of water main construction that most households would begin receiving Melamchi water in less than six months time (Interview 9/24/2017; Interview 10/14/2017). Nonetheless, Sabin, the second official quoted above, declined to participate in a follow-up interview in late 2018, and again in 2019 after it had become clear that this proposed timeline was overly optimistic. By that time, a number of political changes at the top had also complicated efforts to garner access to many elements of the planning process above and beyond what was released in official progress reports, as mandated by lending organizations.

In spite of the techno-optimism expressed by engineering and planning officials back in 2017, this view was largely dissonant with those of many urban residents, many of whom also felt cautiously optimistic about prospects for a better future, but also expressed skepticism and exasperation about the numerous delays in bringing Melamchi water to Kathmandu, and about the motivations of economic and political elites more generally. One term that I kept hearing repeatedly from common citizens when inquiring about the MWSP was the phrase *thulo manche*, which literally translates as ‘big man’ or ‘big person’, but is used more broadly to refer to bosses and elites who are perceived to enrich themselves to the detriment of the broader population. The day after Sabin expressed that Kathmandu would see “only improvements” in the future, I spoke with a neighbor who told me, “Nepal could be a rich, developed (*bikasi*) country like Switzerland, but our *thulo mancheys* and our political leaders (*netas*) only think about how they can enrich and develop themselves

(*afney bikasi bhayo*)” (Interview 10/15/2017). Such tropes about the role and motivations of the *thulo manche* figure can be encapsulated by Koirala’s (2019:2) description that “a *thulo manche* is someone who can lord over those weaker than him; who is not constrained by law in the pursuit of his goals and who has money. Lots of it, It is a hierarchical concept”. The role that the *thulo manche* plays in the cultural imagination of Nepal is also broadly resonant with Paulo Friere’s description of elites in his *Pedagogy of the Oppressed* when he writes, “Their ideal is to be men; but for them, to be men is to be oppressors” (Friere 1968:32; Koirala 2019). This conflation of political and economic power with oppression was a theme I would encounter again later in the research process.

Although I spent much of the initial weeks of this research engaged in participant-observation and conducting semi-structured interviews about daily water practices in Nepal, I would return to discussions of the role of the *thulo manche* figure the following year as it was becoming increasingly clear that Melamchi water wouldn’t likely arrive during the course of this fieldwork. I was speaking with a documentary filmmaker, who was born and raised in Nepal, but who also had a house in London and dual citizenship with the United Kingdom, about the role of power, wealth and gender in regard to the *thulo manche* figure as a cultural form when she told me:

“A *thulo manche* is more about relationships than about money. You may have money here, because you are a foreigner. People also think I’m rich here, because I live in England. But you or me cannot be real *thulo manche* in Nepal. It’s not like England or America. Here in Nepal it’s only the poor who suffer. The rich can do what they want if

they can pay. Say someone commits murder or a rape here. They only go to prison if they can't pay the blood money. 10 Lakh for a human life<sup>18</sup>. Some of my relatives are in the police and army. A real *thulo manche* doesn't always need to pay in the first place. But you or me cannot be a real *thulo manche* in Nepal. I could be the daughter of a *thulo manche* though". (Interview 8/18/2018)

Other respondents who had never lived abroad also spoke about the *thulo manche* as a relational concept, with one research participant proclaiming, "here we have *thulo manche* and we have *sano manche*. The *thulo manche* gives orders and tells us what to do, and the *sano manche* must obey" (Interview 8/30/2018). Despite this, the level of public acquiescence toward officials involved in MWSP planning declined during the course of this fieldwork as the timeline for the arrival of Melamchi water kept getting pushed back and efforts to build new water distribution systems in Kathmandu caused disruptions to daily life.

Public protests surrounding inconveniences from the construction of Melamchi infrastructure in the Kathmandu Valley were already taking place in 2017 at a time when officials were publicly and privately heralding the imminent arrival of Melamchi water (Interview 9/23/2017; Interview 10/14/2017; Interview 10/15/2017). One spontaneous protest sprang up in the neighborhood of Chabahil over road repairs that had been delayed for months after MWSP construction crews had laid down new water mains, but never re-surfaced a major traffic artery after tearing it up. Faced with

---

18 10 lakh, or 1,000,000 Nepali rupees was equivalent to \$8800 at the time of this research

ruts and potholes too deep for smaller vehicles to traverse, many of which had later filled up with waist-deep water during the monsoon season, a couple hundred neighborhood residents took to the streets demanding that the city authorities make the road passable and reduce the risk of vector-borne illness by not allowing such large quantities of water to stagnate in a densely populated residential neighborhood. An official from the Department of Roads ultimately responded to the protest by claiming that the MWSP officials had never informed the Department of Roads when the construction to lay the water mains would be taking place, and that the Department of Roads had already spent its annual budget re-surfacing the thoroughfare in question just before the road was ripped up to install the water mains (Interview 10/15/2017). One interview respondent who was studying engineering at a local university remarked that the primary problem wasn't a lack of knowledge or expertise among planners in Nepal, but rather a lack of willingness from planners in different departments and bureaucracies to work with one another (Interview 10/21/2017). Indeed one of the basic tenets of the Integrated Water Resource Management (IWRM) paradigm practiced in many countries around the world is the need for coordination between actors representing different, yet inter-connected, planning departments and bureaucracies to work with one another to implement large-scale water projects more effectively (Agrawal et. al 2000; Pires et. al 2017). While IWRM approaches have their share of critics for their heavy reliance on expert knowledge and privileging of highly technical solutions, many respondents in Kathmandu emphasized that a lack of willingness of elites to coordinate their plans

with other, presumably rival, elites was causing ordinary citizens to suffer while driving up the cost of projects that were already underway (Bakker 2013; Hussein et. al 2017; Interview 10/21/2017; Interview 10/24/2017; Interview 10/30/2017; Pacheco-Vega 2020).

*International donors, governmental agencies and consultants*

After conducting an initial set of interviews with a small, but optimistic group of local planners and engineers in 2017, and after hearing more critical views from urban residents who were skeptical that public officials would deliver on their promises, I was able to meet and talk with a sampling of representatives of the international donor and consultant community. Though in some select cases I was able to talk with representatives who had direct knowledge and involvement in the MWSP, several of the research participants were foreign consultants and engineers who were involved in water infrastructure projects elsewhere in Nepal and/or those who had experience contracting with Nepalese government entities. All of the research participants in this section will be referenced without personal identifying information in order to protect the identities of those respondents who shared politically sensitive and/or proprietary commercial information. Later in this chapter, I will draw upon other sources that are already in print and available to the public to provide additional context to findings from these interviews about the relationships between government entities and consulting firms involved in the MWSP.

One of the core themes that emerged from interviews with foreign consultants who have recently worked on contracts with government entities in Nepal involved what several respondents saw as a need for greater structure and coordination in existing projects, which was broadly consonant with I had already heard from local engineering students (Interview 10/21/2017; Interview 10/24/2017; Interview 1/30/2018; Interview 2/3/2018; Interview 2/8/2018). One water sector consultant who had worked on several projects further afield in Nepal emphasized how many organizations within the international lending and donor community were mobilizing resources for professionalization workshops in an effort to train Nepalese government planners and experts<sup>19</sup> (Interview 2/3/2018; Interview 2/8/2018). Curious as to what exactly international lending organizations were attempting to train Nepalese officials to do, I asked for more detailed information about the scope of the workshops, and to my surprise, received a USB drive with several gigabytes of presentations and documents at a subsequent meeting. One of the core themes that was interwoven through presentations given to a range of representatives from government entities across Nepal was the need to develop standard operating procedures (SOPs) for performing official duties in a consistent manner (Interview 2/8/2018). Hundreds of slides from multiple presentations highlighted examples of how to develop such SOPs for various iterative tasks that government engineers and scientists would be expected

---

19 I am keeping the term ‘experts’ deliberately vague in this section, in part to emphasize the vocabulary used by many of the consultants themselves, but also because a more detailed description of the particular government departments involved would reveal the identity of the consulting firm and staff in question, and potentially reveal proprietary commercial information.

to perform, including some tasks that were relatively new to certain regions of Nepal, such as developing parameters for water quality monitoring.

Having received more detailed information about the particulars of what various foreign consultant firms were actually doing in Nepal beyond producing the sorts of publicly available impact assessments and feasibility studies I had already read previously, I attempted to broach the topic as to what some of the social and political challenges were that the consultants were experiencing – a topic some engineers and scientists felt far more comfortable addressing than others. One representative of an international development agency who had some knowledge of the MWSP and who was about to leave Nepal permanently only sighed, shrugged and stated, “well ... here in Kathmandu the main weak link is KUKL. They spend all this money and hire all these consultants, and still ... well let’s just say they still have a lot of work to do” (Interview 2/17/2018). As this respondent spoke, another colleague who was present at the meeting nodded and the two looked at each other and both rolled their eyes. Created in 2008 in response to the strong anti-privatization movement in Kathmandu and the entry of the Maoists into mainstream politics in Nepal, there have been numerous efforts by the international community to reduce waste and water-theft from KUKL-managed infrastructure, yet by most estimates losses continue to comprise far more than is recommended by most engineers or system managers, and far more proportionally than in many urban water systems elsewhere (Interview 2/17/2018).



These initial interviews with foreign consultants and engineers re-affirm many insights within the literature about the role that particular forms of expert knowledge have played in shaping discourses of development (Bakker 2013; Escobar 1995; Escobar 2017; Swyngedouw 2004). While the Kathmandu Valley has historically drawn upon its own indigenous knowledge to maintain its ancient water systems, the failure of such systems to meet the needs of all citizens through political changes, rapid population growth and a shift in lifestyles and social relations of production, has necessitated a new kind of thinking, one driven by a greater emphasis on efficiency, bench-marking, quantitative indicators and professionalization through standardization. Earlier scholarly work within the critical tradition of social theory has often framed these changes – in particular, those that draw upon the conceptual language of efficiency, incentives and loss-reduction – in terms of the hegemony of global neoliberalism and its inherent antagonism with older and indigenous modes of knowledge production (Boelens 2014; Escobar 1995; Escobar 2017; Harvey 2006) Yet many of these approaches also fail to acknowledge the inter-linkages between different forms of knowledge, or that the very systems needed to bring supplemental water to Kathmandu will also provide the flows necessary for keeping the water flowing through the ancient *hiti*, adding additional layers of complexity to the city's urban metabolism and enabling residents more freedoms to live the lives they value and have reason to value (Brenner 2011; Crow 2007; Sen 1999; Swyngedouw 2012)

The interviews I conducted with planners and engineers during this fieldwork in Nepal coupled with recent changes in the geopolitical context have prompted me to

refine and adapt some of the core insights from the Anglo-American literature in two ways: first, some of the most robust data on water conditions and technologies in Nepal have come from local experts themselves, and second, the role that China has come to play in recent development initiatives has confounded longstanding explanations of what neoliberal orthodoxies are and how they operate. To be sure, foreign consultants and engineers still play a major role in contracting with international lending organizations, like the ADB, and some specific sets of expertise, such as tunneling work for the MWSP, are still built on collaborations between international and domestic actors in Nepal (ADB 2018; Rest 2019). At the same time, the notion that the adoption of neoliberal, structural reforms has become a truly global trend as more and more states redefine their primary *raison d'être* toward adjudicating contracts and enforcing private property rights (Harvey 2006; Brenner 2011) has been transformed by geopolitical transformations that have led to a resurgence of a state-directed development model best exemplified by China's BRI. To be sure, this initiative, too, retains some elements of the conceptual language of efficiencies, benchmarks and incentives often associated with the sorts of neoliberal reforms that are linked to the World Bank, IMF and SAPs. Nonetheless, in the following section, I will trace the most recent political and technical developments in the slow and tortuous completion of the MWSP to contend that the current moment represents a conceptual break with the past – one that may be better characterized as (authoritarian) state-led developmentalism with neoliberal characteristics for a new era.

*Drilling tunnels and capping dissent: a turn toward China,*

During the final year of this fieldwork several significant developments took place with long-lasting implications for governance in Nepal and the completion of the MWSP. First, Nepal was governed by a united Communist Party (CPN), holding a supermajority that managed to introduce several shifts in policy, including a new privacy law that limited the flow of information about government proceedings to the general public. Then the Italian engineers working on the Melamchi tunnels were jailed after their firm entered into a contract dispute with the Government of Nepal, ultimately resulting in the contract being canceled. A new contract was subsequently awarded to a Chinese state-owned enterprise (SOE) at the same time the Government of Nepal was signing onto the Chinese Belt and Road Initiative (BRI). Bilateral ties between Kathmandu and Beijing also grew much closer, with Nepal's cabinet officials taking several days out of their busy schedules to participate in training seminars on Xi Jinping Thought for a New Era as they prepared to welcome the first visit by a Chinese head of state in nearly three decades. This took place against a backdrop of deteriorating relations between China, on the one hand, and India and United States, on the other, with the Government of Nepal getting caught in the cross-hairs of a geopolitical stand-off between China and the United States, in particular. Finally the tunnels between the Melamchi Valley and Kathmadu Valleys were completed, although finishing work on the tunnels' interior and testing needs to be performed before water can start flowing.

During the first year of this fieldwork the two largest communist forces in Nepal, the longstanding Communist Party of Nepal-United Marxist-Leninist (CPN-UML) and the Communist Party of Nepal-Maoist Centre (CPN-M) entered into talks to form a unified coalition to contest the 2017 general elections together. The 2017 general elections were the first such elections held after the newly ratified Constitution of 2015 triggered an Indian-backed blockade and humanitarian crisis, which had only ended the year before. During the 2017 campaign, KP Sharma Oli of the CPN-UML and former Maoist commander Pushpa Kamal Dahal ('Prachandra') of the CPN-M, both of whom had served short-lived stints as prime minister during the previous two years, agreed to run on a unified ticket, although their respective parties remained formally separate at the time (Interview 10/17/2017). The election campaign itself was marked by notable anti-India rhetoric and a promise among the communist parties to forge closer relations with China if elected. Maoist leader, Dahal, also emphasized his role in making the Kathmandu Valley's power supply more reliable during his most recent stint as prime minister in 2016-17. While load-shedding in excess of 12 hours/day had been commonplace across Kathmandu as recently as the end of 2016, Dahal emphasized his administration's crackdown on corruption within the Nepal Electricity Authority (NEA). The NEA had reportedly had enough generation capacity to provide 24-hour electricity, but deliberately cut power to most neighborhoods in an effort to enrich NEA department heads, who were reported to receive kickbacks to keep the power on for certain clients and also owned controlling

stakes in solar panel and diesel generator companies (Interview 10/17/2017; Interview 11/3/2017; Kathmandu Post 12/16/2016).

Although the unified communist parties won a resounding share of the popular vote in the 2017 general elections, winning large majorities in all of the major hilly districts except for the Kathmandu Valley, the trope of the *thulo manche*, and of the abuse of power of political elites continued to occupy a prominent place within the discourses of many every day citizens. When I asked one group of local university students who were already discussing the elections whether they thought having political leaders with broader popular support would help improve the delivery of services, such as urban water, I was told, “The bigger the leader (*netaji*) the bigger the support, the bigger the chance for theft and failure” (Interview 12/14/2017). Another respondent from the group stated, “The politicians here who shout the most about corruption are often the most corrupt of all. The only thing a *thulo manche* fears is a bigger *thulo manche* or a *neta*” (Interview 12/14/2017). A third member of the group, merely began singing, “*Oho netaji balla palnu bho, bhudi halladai satta dhalnu bho...*”, lyrics to a popular Nepali language reggae song by the group Joint Family Internationale that criticized the greed and excesses of politicians and elites (Interview 12/14/2017). Elsewhere in Kathmandu, an older neighbor had previously expressed hope that the Melamchi water would arrive soon, but even he proclaimed

“if it does come this year<sup>20</sup> it will be in spite of our elites (*netas ra thula mancheharu*), not because of them (Interview 10/16/2017). Nonetheless, the CPN-UML and the CPN-M collectively won more than two-thirds of the nationwide parliamentary seats in the 2017 general election, though the Nepali Congress (NC) had a stronger showing in Kathmandu itself, prompting the leaders of the two communist forces to begin negotiations on a merger to form a singular, Communist Party of Nepal (CPN),

The newly elected government spent much of its first year in power engaged in arduous negotiations to complete the formal merger between the two formerly discrete communist parties. Several local media sources reported a power-sharing agreement would take place where K.P. Oli of the CPN-UML would serve as prime minister for the first half of the five-year term, while Dahal of the Maoist Centre would serve as prime minister for the second half once the party merger was complete (Kathmandu Post 12/19/2017; Kathmandu Post 12/23/2017; The Himalayan Times 2/15/2018; NDTV 2018). After several months of talk over the terms and conditions of merging the two parties, a unified Communist Party of Nepal (CPN) was finally declared later in 2018, several months into Prime Minister Oli’s new term as prime minister. Former Maoist leader Dahal would serve as party chair of the newly unified

---

20 Although I am citing the dates of interviews using the Gregorian calendar to make these findings legible for a non-Nepali, international audience, within Nepal itself all official correspondence uses the *Vikram Sambat* calendar, which begins its first month of the new year in mid-April of the Gregorian calendar. Other ethnic groups in Nepal also use their own calendars. The date October 15, 2017 would be 30 *Ashwin 2074* or 30-06-2077 as written in the official *Vikram Sambat* calendar of Nepal.

CPN, with the implicit understanding that he would take on the top job later in the term. Although power struggles within the ruling CPN would emerge soon after its formal unification, and spill out into public view in the following months and year, the merger of the two parties was nonetheless initially heralded as a resounding success – one that would bring political stability and true majority rule to Nepal after years of political turmoil and short-lived governments (Diplomat 12/2017; Diplomat 2/2018; Dahal 2018; Interview 3/23/2018; Interview 4/1/2018).

Once unified, the CPN made passing a new privacy act its first political priority – a move that would ultimately have profound implications on the ability of journalists, civil society representatives and researchers to document and chronicle the statements and actions of politicians and other public figures. Ostensibly the Individual Privacy Act of 2075 (2018) mirrored similar initiatives being pursued in Europe at the time in the sense that its putative aim was to ensure greater digital protections for the data of citizens of Nepal. Article 28 of Part 3 of the Constitution of Nepal guarantees the right to privacy and the protection of information as a fundamental right stating, “The privacy of any person, his or her residence, property, document, data, correspondence, and matters relating to character shall be ... inviolable” (Constitution of Nepal 2015: Part 3-Article 28). The Individual Privacy Act – the first act of legislation pursued by the CPN after party unification in 2018 – was thus an effort to codify these constitutionally guaranteed rights through a legislative act that included formal enforcement mechanisms. Unlike similar privacy laws enacted in Europe and the United States, however, the Individual Privacy Act of Nepal did not contain specific

exemptions for statements made by government officials acting in the course of their official duties, nor does it allow for many government meetings to be recorded, documented or analyzed without explicit permission from all representatives present at such meetings (Nepal Individual Privacy Act 2075 (2018)). The act further prohibits the “collection, storage, preservation, analysis or publication of data without the approval of an authorised person” (Nepal Individual Privacy Act 2075 (2018)). Many meetings of organizations such as the Melamchi Water Supply Development Board (MWSDB) take place behind closed doors, and while reports and summaries from such meetings are made available online periodically, full recordings or transcripts of what takes place are not typically available to the general public. Moreover, press access to such meetings can be limited, with several Kathmandu-based journalists expressing concern over access to meetings of government representatives (Interview 8/18/2018; Interview 9/2/2018; Interview 9/7/2018).

The same year that the Individual Privacy Act was promulgated, the Government of Nepal also updated the national criminal code with specific provisions that could provide potential sanctions for political cartoons and satire. Article 306.2.c of the Criminal Code of Nepal was updated in 2018 to criminalize satire that “disrespects” an individual, using a vague legal term that allows political leaders and public figures who may be the object of such satire to launch an objection against any material they perceive as “disrespectful” (Criminal Code of Nepal 2018; Kathmandu Post 8/16/2018). Although this particular provision was not enforced against journalists writing about the Melamchi project during the course of this fieldwork, this article,



along with a similarly vague, older provision of the criminal code that prohibits “offending the public morality”, were employed to arrest and charge members of the Kathmandu-based hip-hop group, V-Ten, twice during the course of this fieldwork for the crimes of “offending the public morality” and singing “disrespectful” lyrics about the Nepal Police in one of their songs (Criminal Code of Nepal 2018; Human Rights Watch 2019; Kathmandu Post 10/24/2019). The enforcement of such legislation, in practice, is often patchy, with some critical editorials published in mainstream publications without incident, while other times the law is enforced against singers, journalists and film-makers alike (Interview 9/5/2018).

In addition to arresting entertainers and rap artists, a total of six journalists were arrested during the first year after the Individual Privacy Act was passed into law after senior political figures launched complaints over journalistic investigations of which they were the target (Human Rights Watch 2019). In one such instance, the editor of an online newspaper was arrested after launching an investigation of fraudulent business practices between municipal officials and a private contractor in the city of Pokhara. In another related case, a local official from an opposition party was arrested for sharing a satirical post of Prime Minister Oli on his Facebook page (Kathmandu Post 9/2/2018). The charges in both of these cases were later dropped after a review by the Supreme Court of Nepal, but only after the accused had already spent several days in police custody. One journalist I interviewed stated, “most of us will not face serious penalties for criticizing the politicians. They are mostly meant to intimidate. To encourage self-censorship” (Interview 9/9/2018). Another journalist warned, “but

you should be more careful. Because you are a foreigner, they can arrest you and deport you quickly if you say something about the leaders. They only have to say you are interfering in their affairs” (Interview 9/5/2018). Indeed an Australian NGO worker and film-maker that I had known personally for nearly three years was, in fact, arrested and deported in 2020 after being detained while filming at a political protest without prior permission. He was deported on the charge of engaging in political activities, in violation of the terms of his visa, and “interfering in the internal affairs of Nepal”,

Given the political changes that had been occurring in the years after I first began this fieldwork in 2017, I progressively grew more cautious about my own interactions with government officials over the course of this research. While I had enthusiastically met with such officials back in 2017 to ask them a litany of questions about the progress of the MWSP, as the research progressed I found myself relying more and more on meetings with journalists, civil society workers, members of the international donor community and affluent business people to learn about Nepalese officialdom rather than attempting to engage with such actors directly. The fact that officials such as Ram and Sabin who had responded to my earlier inquiries did not express strong interest in participating in follow-up interviews also led me to pursue alternative avenues to learn about what was transpiring with the MWSP. Such efforts to find work-around strategies to engaging with political officials and leaders directly is consistent with the polymorphous approach often employed by social scientists studying elite actors who evade or resist direct interactions with researchers

(Gusterson 1997). Given the challenges and tensions that were unfolding between the foreign engineers working on MWSP at the Government of Nepal, at the time, I also found it best to observe from a distance.

Although the Melamchi tunnels were almost completely finished by the second half of 2018, a stand-off between the Government of Nepal and the Italian engineering contractor *Cooperativa Muratorie Cementisti* (CMC) would further delay project completion. Engineers from CMC had expressed in previous interviews how challenging it was drilling through the soft, crumbly and often geologically unstable rock forms that separated the Melamchi and Kathmandu Valleys (Rest 2018; Rest 2019). Although the 2015 earthquake caused cracks to form along the portions of the tunnels that had already been completed at the time, it was the subsequent blockade of 2015-16 that ultimately was the single greatest contributing factor toward further delaying the completion of the project (Rest 2019; Shrestha et. al 2020). The combination of additional repair work that was required after the earthquake, coupled with the ensuing blockade, led to additional costs in completing the project at a time when CMC itself was teetering on the verge of bankruptcy. CMC had been claiming an additional 2 billion rupees (\$17.31 million) for the disruption of work caused by the earthquake, blockade and ensuing political unrest (Kathmandu Post 12/20/2018). In a late 2018 meeting, the Government of Nepal ultimately agreed to release 390 million rupees of the requested sum to CMC to continue the work on the tunnels (Kathmandu Post 12/20/2018; Spotlight Nepal 2018). By the third week of December, CMC contractors had still not received any of the 390 million rupees needed to

continue construction work and decided to return home to Europe for the Christmas holiday. The engineers were subsequently arrested at Tribhuvan International Airport, accused of trying to flee the country, and held for several days until CMC higher-ups back in Italy could negotiate the conditions of the engineers' release (Nepali Times 12/28/2018; Spotlight Nepal 2018).

After their detention and arrest while trying to fly back to Italy for the holidays, the CMC engineers who had been working on the MWSP refused to return to Nepal, while the firm refused to accede to the government's demands. A few months later, a Kathmandu-based media outlet released a series of interviews conducted with eight of the CMC engineers over a period of two months in which several of the engineers alleged "rampant corruption, regular demands for commission by government officials and labyrinth bureaucratic hassles" as primary reasons why the cost overruns had occurred in the first place, and why CMC ultimately decided to pull out of its contract with the Government of Nepal (Kathmandu Post 3/21/2019). Officials involved with the Melamchi Water Supply Development Board (MWSDB) declined requests for interviews from multiple Kathmandu-based media outlets, and never affirmed nor denied the charges laid out by CMC engineers and contractors. A new tendering process was opened up to attract bids to complete the Melamchi tunnels, which by that point were nearly finished. The tendering process added an approximate nine additional months to the construction process, but by the second half of 2019 a Chinese state owned enterprise (SOE) was awarded a contract to

complete the tunnels at a time when Kathmandu was actively pursuing closer relations with Beijing.

The blockade of 2015-16 profoundly transformed Nepal's geopolitical positioning, leading to a souring of its relationship with India and enhanced efforts to pursue closer relations with Beijing. Indeed suspicion of both of Nepal's larger neighbors runs deep among large sections of the general population. Scholarly work and research conducted even before the blockade was implemented indicates a longer, deeper history of mistrust and suspicion of India's intentions in Nepal, with lingering resentments rooted in perceptions of land grabs that date back to the signing of the 1816 Treaty of Sugauli (Butler 2016; Thapa 2010; Upreti 2010). Among some Nepalese respondents I spoke with there was a perception that during the time of British India the colonial rulers were fair in giving back Nepalese land in the Terai that had initially been claimed by the UK (Interview 4/30/2019; Interview 5/14/2019).

The government of independent, post-colonial India, on the other hand, hasn't always been viewed as quite so even-handed; given that contemporary India is itself a former British colony, so this thinking goes, then it should return the land that rightfully belonged to Nepal (e.g. Darjeeling, Garhwal etc.) before the era of the British *raj* (Interview 5/14/2019). To emphasize India's perceived legacy of land grabs, one of the defining foreign policy achievements of Prime Minister Oli's administration, other than pursuing closer ties with Beijing, has been the release of a newly-drawn national map to emphasize that the disputed territories Kalapani, Lipulekh and Limpiyadhura are integral parts of Nepal's territory (Bhattari 2020; Nayak 2020). In

fact, the recent re-drawing of Nepal's official maps to include more clearly the indivisible territories of Kalapani, Lipulekh and Limpiyadhura was the one significant policy measure of the last few years that transcended Nepal's domestic partisan divisions, drawing no formal opposition among any of Nepal's parliamentary parties (Bhattarai 2020). These remote territories lie between the east and west branches of the Mahakali River – defined by the Treaty of Sugauli as the western boundary of Nepal – and re-entered the political debate in 2019 when India's army began building a road across the contested borders between India and Nepal, and only a short distance away from territory that is disputed between India and China (Barman 2021; Nayak 2020).

Beyond longstanding suspicions of India and its role in Nepal's political life, Nepal's political leaders recently have been divided over how to respond to what one political analyst described as “Nepal's third powerful neighbor, the neighbor in the sky” - the hegemonic panopticon that is the United States (Interview 5/17/2019; Interview 5/19/2019). For much of the past few years Nepal's parliament was involved in debate over whether to accept a grant through the US State Department-backed Millennium Challenge Corporation (MCC) to build high capacity electricity transmission infrastructure. Under a previous Nepali Congress (NC) led administration the Government of Nepal and the US State Department agreed a deal for \$500 million to build high voltage transmission lines and provide funding for road construction to support the putative goals of reducing domestic transportation costs while providing sufficient electricity voltage to support industrial development (MCC

2021; US Embassy in Nepal 2021). Under the terms of the original deal, the Government of Nepal would provide \$130 million in funding toward these projects over a period of several years, while much of the rest of the cost would be provided in grants. Nonetheless, many of the details of the project's terms and conditions aroused suspicions within Nepal's ruling NCP, especially after the 2015-16 blockade.

Concerns about the Government of Nepal's role in implementing its agreements through the MCC were greatly amplified by the trade war and resulting geopolitical tensions between the United States and China. Of particular concern to diplomats and policy-makers in Nepal was a clause in US law, and on the State Department website at the time, defining the MCC as an economic component of the US government's Indo-Pacific strategy (Amatya 2020). Lawmakers and politicians from across the political spectrum in Nepal expressed reluctance and strong reservations against accepting any grant or development aid that was tied to a security strategy in any way, shape or form (Kathmandu Post 1/9/2020). Nepal was historically an active member of the non-aligned movement throughout the Cold War era, and while the non-aligned movement no longer plays the same role as a multi-lateral forum today as it did a few decades ago, Nepal's political leaders across the spectrum of parties resolutely oppose formal security alliances with any other country (Amatya 2020; Interview 5/17/2019). When representatives of Prime Minister Oli's administration later requested a meeting with US Ambassador to Nepal Randy Berry to discuss whether the MCC grant implied any sort of formal alliance with the United States and to clarify the relationship between the MCC and the Indo-Pacific Strategy, the US Ambassador

replied, “the Indo-Pacific strategy is simply the name we have given to everything we do in the region and security is an important part of ensuring the Indo-Pacific remains free and open” (Amatya 2020; Kathmandu Post 9/28/2019). Unsatisfied with this explanation there was an increasing movement in Nepal’s parliament to reject the ratification of any further agreements with the MCC to build infrastructure in Nepal, even though earlier agreements had made it through previous parliaments.

While concerns about having to choose sides in an ongoing geopolitical feud between the United States and China and the desire to remain formally non-aligned were both motivating factors in explaining opposition to the MCC, the United States has also had a much longer history of security-related involvement in Nepal that has complicated relations between Nepal and China. During the earlier Panchayat era the monarchy maintained an open-door policy to the resettlement of Tibetan refugees with hundreds of thousands of Tibetans taking up domicile in Nepal during this time (11/1/2017; Interview 11/5/2017). The United States was the second foreign country to be recognized formally by Nepal and the second country with which Nepal established formal diplomatic relations after the United Kingdom (Nepal formally recognized the US before establishing diplomatic ties with either India or China) (Amatya 2020). During the 1950s US government fears of the spread of communism across Asia were amplified when Tibet began to come more firmly under the control of Mao Zedong’s armies, prompting the CIA to drop arms and provide military training to Tibetan Khampa guerrillas in Mustang District of Nepal – just across the border from Tibet – beginning in 1958 (Basnyet 2019). Tibetan Khampa guerrillas



armed with American-made weapons began launching attacks on People's Liberation Army (PLA) targets throughout 1958 and 1959, initially killing many PLA soldiers in a surprise offensive, but ultimately triggering a larger PLA response that would prompt the Dalai Lama to flee Lhasa with a small group of followers and security forces the following year in 1959 (Amatya 2020; Basnyet 2019).

Although Nepal and Tibetan leaders initially welcomed funding and arms from the United States, the bloody consequences of the CIA's failed efforts to keep Lhasa from falling further under the control of the PLA ultimately caused many former supporters to sour on the United States. Even after the Dalai Lama had fled Lhasa for India, the CIA retained a presence in Mustang District of Nepal throughout the 1960s and continued providing the Khampa rebels with arms and financing, provided they continued crossing back and forth across the border to carry out attacks on PLA targets (Amatya 2020; Basnyet 2019). As the 1960s progressed, however, there were an increasing number of complaints among Mustang locals that the Khampa guerrillas were looting and raping and pillaging from villages in Upper Mustang on the Nepal side of the border with relative impunity (Amatya 2020). Many Tibetans also felt let down that the CIA was providing some weaponry and financing, but not providing any further cover or support for the young guerrillas who were ultimately putting their lives on the line carrying out attacks. One of my own former landlords in Kathmandu – a Tibetan refugee born in 1945 who explicitly asked me to tell this history in my research – once remarked:

“China wasn’t good, but the US, your country, the US was much much worse. At least China, they always made their intentions clear. The US – your country – they gave our boys arms. They gave our people guns. But they never really supported us. They stabbed us in the back. They said they were our good friends, but they did nothing for us. The Chinese... Well the Chinese were always clear about what they were doing there. And the US. They were far worse than China was. They just brought capitalism. It poisons the water. It poisons the air. And I hate it. I just hate it. (Interview 11/14/2017).

The CIA ultimately withdrew its operations from Nepal in the early 1970s right around the same time that Richard Nixon began the process of beginning to establish diplomatic ties between the United States and the People’s Republic of China.

Though the PRC made diplomatic overtures toward the Government of Nepal dating back as far as the 1960s when it provided funding for a road, it has only been in recent years that China has become a major diplomatic player in Nepal, stepping up its investments significantly over the course of the 21<sup>st</sup> century.

The awarding of the contract to complete the Melamchi tunnels to a Chinese SOE was only one of many initiatives in recent years where Chinese entities have stepped up to fill a role in Nepal that previously would have gone to Indian or western private firms. Prime Minister (PM) Oli, who previously had also been PM during the 2015-16 blockade, began aggressively courting Chinese investment back then, securing donations of essential medicines and fuel during his first stint in office, and later traveling to China after the blockade was lifted to formalize trade and transit

agreements designed to reduce Nepal's dependence on India (Sapkota 2019). PM Oli significantly enhanced the areas of cooperation between the two countries after winning the general elections of 2017 in a campaign marked by bombastic anti-India rhetoric. What would eventually become the Belt and Road Initiative (BRI) – or One Belt One Road (一帶一路) ) as it continues to be referred to in Chinese language sources – evolved out of a global expansion of the earlier Silk Road Economic Belt program, and was formally incorporated into the Constitution of the PRC in 2017 – the same year the soon-to-be unified Communist Party of Nepal (CPN) swept the general elections, winning more than two-thirds of the seats in parliament (Bhattarai 2019; PRC Ministry of Foreign Affairs 2013; PRC Ministry of Foreign Affairs 2020; Sapkota 2019) When China began extending work on BRI projects beyond Central Asia and into South Asia, the governments of several smaller countries adjacent to India enthusiastically embraced the prospect of enhanced Chinese investment, especially in countries whose diplomatic relationships with India had been fraught in recent years (Bhattarai 2020; Sapkota 2019).

The Government of Nepal formally joined the BRI in May, 2017, shortly before the general elections of that year, when CPN-Maoist leader Dahal was serving a short-lived stint as prime minister (Sapkota 2019). Due to the rapidly impending parliamentary elections, however, it was under the subsequent unified CPN government of PM Oli, with Dahal as CPN Party Chair, that Nepal and China began to move forward on implementing many of the initiatives that were proposed under the BRI framework. By that time construction work had already begun on a China-

Pakistan economic corridor, linking China's Xinjiang region to the port of Gwador, while similar work had already begun on port facilities in Bangladesh backed by Chinese SOEs (Sapkota 2019). Eager to attract similar investments, representatives from various ministries and planning departments in Nepal began compiling a wish list of projects for which they would seek official backing from the Chinese state. These included hydro-power projects, upgraded electrical transmission lines, upgraded highways and border infrastructure such as dry ports to link Nepal with China, and a rail link to connect Nepal to China's high-speed network, with the last being viewed as a crown jewel of proposed BRI projects among Nepalese officials (Bhattarai 2019; Sapkota 2019).

Government officials from Nepal and China agreed to move forward with the railway project as part of a package of cooperation projects at a meeting in 2018 when earlier agreements to allow Nepal access to Chinese ports were also fully enacted (Adhikari 2018; National Railway Administration of China 2018). Officials on the Chinese side dismissed concerns about the technical challenges of building a major railway across the Himalayas – of which about 98% of the line on the Nepal side of the border would be through tunnels and over bridges – with claims that existing railways in China's Sichuan Province are also built through geologically unstable terrain on lines comprised primarily of such bridges and tunnels (Al Jazeera 9/18/2018; National Railway Administration of China 2018). To many international observers and analysts, concerns about debt trap diplomacy, exacerbated by the high cost of building and maintaining such infrastructure in places with extremely low population densities

on the proposed Kathmandu-Lhasa line, outweighed questions about whether building such infrastructure was technically feasible in the first place (Business Standard 11/2018; SCMP 12/1/2018). Cost overruns had been rampant throughout the building of the Melamchi tunnels, with much softer, and less geologically stable rock forms than had been anticipated in the earliest feasibility studies and engineering reports (ADB 2018; Binnie and Associates 1988; Rest 2018; Rest 2019). Nonetheless, Nepal's Foreign Minister, Pradeep Gyawali, dismissed journalists' questions about the specter of debt trap diplomacy by stating, "I believe this is an imported psychology ... aimed at instilling psychological fear by actors who harbor bad intentions and feelings toward China" (Embassy of the PRC in Nepal 2019; Kathmandu Post 2/26/2019). At the time these statements were made in early 2019, the railway was just one of many priorities being discussed between top officials in Kathmandu and Beijing. Of equal importance were preparations for an upcoming visit by Xi Jinping – the first proposed visit by a Chinese head of state to Nepal in nearly three decades, and the first since China's re-emergence as a major geopolitical player. In preparation for Xi Jinping's visit officials from various Nepalese government ministries pared down the number of BRI projects for which they sought Chinese financing from 35 to nine projects, with the aim of being able to devote more resources and better preparedness for the projects they did intend to pursue (Bhattarai 2019). The proposed Kathmandu-Lhasa railroad remained at the top of this new list of nine projects for which Kathmandu sought Chinese backing (Bhattarai 2019; Sapkota 2019). As the date of Xi's visit grew closer, the ruling CPN of Nepal enrolled 200 of

its top government officials in a two-day training symposium on Xi Jinping Thought for a New Era conducted by a high-level Chinese delegation from the CCP's foreign ministries and propaganda departments (Kathmandu Post 9/24/2019). A couple weeks later, in the first address of a Chinese leader to Nepal's parliament in decades, Xi Jinping remarked, "anyone attempting to split China in any part of the country will end in crushed bodies and shattered bones" (SCMP 10/13/2019). After delivering his stern warning to Nepal's politicians, and indeed to the world, further deals were signed for China to begin carrying out exploratory studies and pre-feasibility studies for the Nepal-China rail link. Nepal, for its part, signed an additional agreement to build only Chinese standard gauge, rather than the wide gauge rail used in India – on any potential new railways built within its territory (Railway Technology 2020). Yet, despite these agreements to move forward with the railway, the project appears to be less of a priority on the Chinese side than other economic corridors, such as the one linking China and Pakistan, and a high-speed railway linking Hong Kong to Singapore. Whether and when plans move forward with such initiatives remains to be seen and will likely depend on political considerations both in China and Nepal, as the rail-link is unlikely to recover initial construction and maintenance costs were it built and operated solely by private, profit-driven firms.

Whether and how extensively China's BRI represents a continuation of global neoliberal orthodoxies or an epistemological break from such ways of thinking and ordering the economy remains an open question and will likely hinge on how such initiatives continue to unfold over the coming years. Based on existing evidence from

the investment of Chinese SOEs in large-scale infrastructure projects in nearby countries, my contention is that in the present moment the BRI is a bit of both – in many instances, the Chinese state provides financing for ventures that are unlikely to generate economic profits in the short or mid-term in an effort to boost its geopolitical influence and profile; in the longer term, however, sustained investment in money-losing ventures outside Mainland China appears far less likely. In his article *Kicking away the Ladder*, Ha-Joon Chang posits that despite the promotion of neoliberal policies by lending organizations like the World Bank and IMF, the largest, fastest and most significant reductions in poverty have occurred in countries that have adopted state-led development policies rather than relying on private firms and global capitalism (Chang 2010). Karen Bakker’s (2010) work on ‘alter-globalization’ defines statism as one of three heuristic categories for making sense of globalization and development. While Bakker (2010) ultimately remains critical of both neoliberal and state-centered models, instead favoring the sort of smaller-scale, community-based governance also championed by Elinor Ostrom, the very inclusion of ‘statism’ as one of her three heuristic categories makes clear that such initiatives continue to play a substantial role in water infrastructure projects, yet remain distinct from neoliberal models (Bakker 2010; Ostrom 1965; Ostrom 1990).

Water infrastructure in present-day Nepal continues to draw on a combination of models and approaches with examples of infrastructure projects backed by privately-held firms, ones funded and operated by government agencies, and numerous examples of smaller-scale, community-governed projects, such as Farmer Managed

Irrigation Systems (FMIS) and community water systems, that all co-exist simultaneously in 21<sup>st</sup> century Nepal (Bakker 2013; Shrestha, Joshi and Roth 2020). Even China’s own BRI is far from a monolith, with some organizations that fall under the BRI umbrella, such as the Asian Infrastructure and Investment Bank (AIIB), adopting lending policies not that dissimilar to those found at the ADB, while other projects implemented under the initiative, such as projects initiated in remote, sparsely populated corners of Central Asia are, perhaps, more likely intended to bolster geopolitical influence in the region than to generate any immediate profit for investors (Barman 2021). In recent years, the MWSP has been touted as a “national pride project” by officials at Nepal’s Ministry of Planning and Public Works, while such officials have continued to maintain public funding and insist upon government majority ownership and control (80%) of KUKL – the entity that manages the Kathmandu Valley’s urban water distribution systems. (ADB 2020; MyRepublica 2/21/2021). Despite this, suspicion of the *thulo mancheys* and political leaders continues to run strong among much of Nepal’s general population, with many residents and newcomers to the valley continuing to rely on private water purveyors and invest in their own community water systems, even in cases where KUKL water remains available (Interview 11/3/2017; Interview 2/4/2019; Interview 2/23/2019; Shrestha. Joshi and Roth 2020).

In the final section of this work, I will return to the lives and stories of the private tanker drivers, the residents who rely on such deliveries and the squatters whose precarious struggles to make ends meet are defined largely by the quest to collect



water. I will also provide follow-up information about citizens' investments in community-managed water systems, the continued desire to draw well water and efforts that some research participants have undertaken to harvest more rainwater. In all of these cases and narratives there runs a thread of underlying hope that the arrival of Melamchi water will soon alleviate daily struggles, yet also an underlying sense of suspicion about the intentions of state actors and a desire to continue to invest in alternative solutions as a way of boosting overall water security and peace of mind. In a world marked by increasingly unpredictable climate and water conditions, a large number of research participants and Kathmandu residents appear to see the value in investing in and drawing on multiple sources of water rather than placing all their hope in one particular project or one particular source. Though my own ability to conduct in-depth interviews with the most elite level of policy-makers and planners in Nepal was somewhat limited, I was also struck by the number of various and inter-linking sources and strategies that citizens can draw on to meet their daily, household water needs. These are the conclusions of this chapter of their stories...

## ***Conclusion***

To address questions of who benefits and of equity impacts of the inter-basin diversion of Melamchi River water, my research demonstrated that: the expansion of municipal water supply will almost certainly alleviate the daily struggles of registered households in Kathmandu's urban core, and likely have a beneficial effect on the daily routines and practices of these people and, in some cases, may well bring added economic benefits, provided the imported water is perceived as being of sufficient quality and reliability to meet household and commercial needs. My research has also demonstrated some of the differential effects and impacts that the availability of imported MWSP will have on various categories of water users based on economic status, geographic location and proximity to alternate water sources. For residents outside the existing service area, efforts to link the availability of MWSP water with groundwater recharge and pond restoration would carry much more wide-ranging beneficial impacts. Initiatives to link the inter-basin transfer of supplemental water with ongoing local efforts to maintain and restore the valley's historic and indigenous water systems would help promote the goal of protecting ancient cultural identities, while also providing additional layers of water security for many who lack full access to piped household water. Residents of informal and unregistered settlements require additional social and policy interventions above and beyond what the dreams of Melamchi water alone can provide for them to truly have the capabilities to realize fully what they value and have reason to value, while the international donor

community and lending organizations would benefit from a deeper engagement with local conditions and histories to ensure that existing social and policy interventions produce tangible benefits for a broader cross-section of the population .

In this dissertation, I first investigated the historical development and evolution of the ancient water systems and technologies of the Kathmandu Valley demonstrating how these water technologies have adapted and evolved over the centuries in accordance with shifts in social relations brought about by gradual transitions to an urban civilization with a complex division of labor. While the European colonial period caused irreparable damage and disruption to many of the ancient water systems of the Indo-Gangetic Plains to the south, the ancient *hiti* of the Kathmandu Valley continued flowing and supplying household water to urban residents without disruption from the imposition of foreign colonial technologies. Though the efforts of Rana rulers to gain legitimacy in the eyes of such European elites in the 19<sup>th</sup> century ultimately led to the codification of social stratification and inequalities in ways that are still being felt today, the underlying technologies and design of the Kathmandu Valley's water systems have endured and continue to be a significant source of household water in Kathmandu in the present day, even as burgeoning population growth presents new challenges to these ancient water systems.

In the second section of this work, I examined the daily struggles of obtaining household water under conditions of scarcity that were prevalent in the final years before the arrival of imported water from the Melamchi Valley. In doing so, I aimed

to draw attention to the relationships between social and geographic variables and the physical and infrastructural modalities through which residents of Kathmandu accessed household water. I looked at how water access and water collection practices varied between homeowners of varying levels of wealth, renters and squatters, drawing attention to the private infrastructure and strategies wealthier residents employed to achieve household water security and contrasting that with the daily struggles faced by those at the margins. In addition, I attempted to show the different modalities for accessing household water between residents of dense urban areas and those in peri-urban neighborhoods in an effort to highlight the diversity of water experiences, the potential for dispossession that community-managed water systems built by affluent settlers can create, and above all the threat of groundwater overdraft and contamination faced by residents who live beyond the scope of the piped municipal network. Finally, I examined the inter-linkages between restoring ancient water infrastructure, and the potential for groundwater recharge, before examining the informal labor economies of tanker truck drivers – many of whom have gone into debt to buy trucks to fill a critical niche in meeting household needs. Future efforts to restore ancient water systems and promote groundwater recharge would do well to consider the labor of this critical component to the informal water economy of Kathmandu if full water justice is to be achieved.

In the final section I examined the long history of elite-driven planning efforts to bring imported water from the Melamchi Valley to Kathmandu, drawing attention to the relationships between socio-political conditions and how pressures from above

and below have shaped and constrained the pathways available to planners to implement large-scale projects to meet basic water needs. Although many everyday citizens are quick to criticize their *thulo mancheys*, or Big Men, many of these planners and policymakers are also constrained by the imperatives of international lending organizations, like the World Bank and geopolitical pressures from their larger neighbors. Grassroots efforts to make political leaders more accountable have resulted in several significant shifts to the MWSP, such as its management by a public entity and heavy subsidies rather than involving a private firm with full cost-recovery born by the poor. Yet many of these efforts have also sparked episodes of political violence, such as the civil war from 1996 to 2006, which led to significant loss of life and a descent into poverty and displacement for hundreds of thousands more. In the end, the MWSP did receive financing from the Asian Development Bank (ADB) and the tunnels were ultimately completed, although water deliveries did not begin during the course of this fieldwork, ultimately leaving many questions still to be answered through subsequent follow-up studies.

By the end of March 2021, the first successful test run of running water through the newly built MWSP tunnels from the Melamchi River to the exit point at Sundarijal in the Kathmandu Valley had been completed (The Himalayan Times 3/28/2021).

Ongoing test runs are now taking place in April 2021, to test various segments of the water distribution system in different neighborhoods of Kathmandu. Although the initial volume of water transferred during the first successful test run was small, and several more rounds of testing need to be completed as of the time of this writing, the

dry season of 2021-22 will likely mark the first time in the city's recent history when residents of core urban neighborhoods in Kathmandu and Patan no longer have to face the struggles of waking up in the middle of the night for water deliveries that may or may not come. More than two decades after the ADB loaned money to begin construction and more than 33 years after the first foreign consultancy conducted a study on bringing Melamchi water to Kathmandu, the underlying infrastructure needed to bring an additional 170 MLD of imported water to urban households has been completed. The availability of additional MWSP water will almost certainly alleviate many of the daily struggles described earlier in the ethnographic chapter of this work, though even with the additional supply of imported water there will still be a shortfall between the availability of municipally supplied water and daily household consumption.

In the short and medium-term, households and businesses in core urban neighborhoods will likely benefit from longer proposed hours for water deliveries. For instance, according to a planning document from the municipal water purveyor, KUKL, MWSP water is scheduled to be distributed via the Mahankal Chaur supply center to a selection of core urban neighborhoods, ranging from four to seven hours of water service every other day once testing is complete (KUKL 2021). The densely populated commercial strip of New Road, and immediately surrounding residential areas, for example, are scheduled to receive piped municipal water every other day from 2am to 9am (KUKL 2021). Other core urban neighborhoods, such as Maitdevi and Dilli Bazar are slated to receive piped water service from 8PM until midnight on

alternate days (KUKL 2021). The proposed schedule for these deliveries would eliminate the need for residents and business owners in these neighborhoods to wake up in the middle of the night to fill their storage tanks, given that most core neighborhoods are slated to receive piped water either during morning or evening hours, for long periods and more frequently than ever before. This would also reduce the volume of water storage needed for newcomers to the area, although many long-term residents are likely to wait and see how reliable the deliveries turn out to be before making any major changes in the types of storage infrastructure they use.

For several of the respondents I interviewed regularly who live in dense urban neighborhoods, the expansion of municipal water supply will likely have a beneficial effect on their daily routines and practices and, in some cases, may well bring added economic benefits, provided the imported Melamchi water does arrive during the Vikram Sambat year of 2078 (2021-22 in the Gregorian calendar). During one of the last interviews I conducted with Karma, the Tibetan refugee, he mentioned that he had decided not to rent out one of the two flats in his building after the tenants living there had moved out, because he was concerned the available water supply and storage was insufficient for three floors worth of people (Interview 8/7/2019). Given that Karma was already retired and depended on the rental income from this tenants to pay his living expenses and medical bills, the decision to leave one of the two flats empty was one he did not take lightly, but he mentioned several times in that last interview that he worried about running out of water if he kept a full house (Interview 8/7/2019). Karma's neighbor, Bhojraj, the long-time land-owner in that neighborhood

also mentioned in the last interview I conducted with him that he might return to using the municipal water supply, instead of relying on tanker deliveries, if it turned out that the water quality improved after the arrival of Melamchi water (Interview 8/7/2019). Bhojraj mentioned though that he would wait some time after the neighbors started using Melamchi water before making a decision whether to switch back to the municipal supply as a primary source for his household's needs.

During an even more recent interview I conducted with Ismail, the owner of the larger six story residential building and restaurant, I was informed that Ismail would likely buy less water from the tanker trucks once MWSP water began flowing, but that given the number of people living in the building he owned and the brisk business his restaurant did, he would likely continue relying on both sources for the foreseeable future (Interview 2/4/2020). Shortly after I conducted this interview with Ismail, his restaurant was closed for several months due to local COVID-19 related lockdowns in Kathmandu. More recently, a close friend informed me that the restaurant has since re-opened and business is booming again, but I have not had the opportunity (or IRB approval after 9/2020) to sit down with Ismail to conduct a follow-up interview in the months since the restaurant re-opened. During a follow-up interview with Ismail's wealthy neighbors, Trishna and Kumar, I was struck by how red and raw their adopted domestic worker, Ishwor's hands were on that chilly, cloudy February morning. I asked whether Ishwor had woken up early that morning to collect water and Trishna replied, "He wakes up every morning to water the plants and do the laundry and wash the terraces and deck before 6 am. I like to have all the



chores and cleaning finished before I wake up” (Interview 2/5/2020). Although the arrival of Melamchi water may provide one less reason for Ishwor to wake up in the middle of the night, my sense was that he will continue being compelled to begin household chores well before dawn, regardless of how reliable or convenient the municipal water supply is.

For many residents who live beyond the reach of municipal services, however, life will like change little from the arrival of MWSP, even though the availability of more water overall will likely re-shape the private and informal water sectors. Two years after I first interviewed Ajay and Aarti – the Rajasthani migrants – in their squatter settlement where they lived with several other families, Kathmandu Metropolitan City (KMC) authorities had completed the demolition of the settlement near Chuchepati where Ajay and his family had previously lived and where I had conducted interviews during the initial months of the research. I only learned of the demolition when I saw Ajay near a bus stop, offering his shoe repair services, just before the start of the monsoon season in 2019. Although Ajay seemed reluctant to talk to me at first, eventually he asked if we could go get some tea and talk. He told me that the police had come with construction crews and bulldozers a few weeks earlier in the middle of the night and that everyone had been evicted from the settlement and a wall was quickly built to keep the residents from returning to their old homes (Interview 6/27/2019). As he spoke, I noticed that Ajay had the leftover marks of a black eye that had mostly healed. As I glanced over at him, he quickly blurted out that his new neighbors had a problem because he was a foreigner from

India, before quickly changing the subject and talking about his children's school work (Interview 6/27/2019). I asked where he and his family had gone and learned that they had re-located to a different squatter settlement much further from the city center than they had lived before. The water situation was even worse in the new settlement than it had been previously, so I was told. Ajay told me the new neighbors where he lived were very suspicious of outsiders and newcomers and it would be better not to visit him at his home, as I had done two years earlier. I bought Ajay a meal and we parted ways. That interview was the last I ever saw of him.

After talking to Ajay, I realized I still had the contact information of a couple of his neighbors from the settlement where I had conducted interviews previously. Many of Ajay's Nepali-origin former neighbors had either moved into registered dwellings or left the country to pursue more lucrative, albeit risky, work abroad. Suraj, who had owned his own tractor, which he used to collect recyclables and scrap metal had moved into registered housing with his family in a neighborhood not far away from where the squatter settlement once stood. He mentioned in a phone call that his work was very dirty and that he hoped for a different career path for his own children, but that they had peace of mind in the new building where he and his family shared two rooms (Interview 6/29/2019). Suraj also mentioned that his former assistant Ramesh and Ramesh's wife Maya were not able to find registered housing near where they had lived before so they used the little money they had been saving to try to buy a tractor and went to a recruiting agency to try to find work abroad. Ramesh paid a recruiter his full savings as a commission and ended up taking an additional loan from

the recruiting agency to secure a position as a laborer in Qatar (Interview 6/29/2019). Ramesh's wife, Maya, was unable to secure any position lawfully (the Government of Nepal officially bans the outbound labor migration of women under the age of 45) and had gone to live with her relatives in their ancestral village. Nonetheless, Ramesh was trying to save extra money to pay a head-hunter to help Maya migrate to Saudi Arabia to be a domestic worker through backdoor channels via India and Myanmar (Interview 6/29/2019). I was unable to follow up with either of them afterwards to find out how Ramesh's stint in Qatar was going or to ascertain whether Maya had been able to find a way forward with her plans to find a back door into a job in Saudi Arabia, though I did have a local friend talk to Suraj to convey to Maya the high level of risk of pursuing this backdoor route.

For many of the residents I interviewed who were already facing some of the greatest daily struggles and challenges, the extra convenience that Melamchi water might bring will likely be only of limited consolation when compared with the greater challenges of maintaining a place to live, putting food on the table every day and ensuring basic household security. Of the people I interviewed previously in the squatter settlement, only Suraj had managed to move into more secure housing, and he was the only person I met in the now-demolished settlement whose family had sufficient water storage capacity to avoid the hours' long struggle to collect low-quality water every day. For all of the other residents of that now-demolished cluster of homes, the struggle to collect sufficient quantities and quality of household water endures, irrespective of the urban infrastructure improvements, or new struggles have

emerged in cases of those who have pursued new avenues of work outside the Kathmandu Valley, such as for Maya and Ramesh. Likewise, for residents who live beyond the reach of the piped municipal network, the impacts of Melamchi water reaching Kathmandu will likely be more limited in the near-term, although such residents will be indirectly affected, especially tanker drivers and those who rely on groundwater wells.

Although I have not had opportunities to conduct formal follow-up interviews with participants in this research after a strict COVID-19 pandemic lockdown was enacted in Nepal in March 2020, I do know from conversations with close friends and from my own experiences grounded in Nepal for the duration of the 2020 lockdown that most research participants suffered greatly from the heavy restrictions on economic life that were in place in Nepal from March-June 2020 and then again from August-September 2020. The decision of the Government of Nepal to place the entire country under a strict lockdown, which allowed virtually no movement outside of the home, at a time when there was only one active confirmed case in the entire country likely helped prevent the spread of the virus during the first wave of the pandemic at a time when many western countries were experiencing significantly higher rates of infection and death. Nonetheless, the impact of such restrictions on daily wage earners and the urban poor was extreme, especially for migrants who were unable to return to ancestral villages where food reserves were more plentiful before the restrictions were enacted. One exception to this were the tanker truck drivers and their assistants whose trucks, along with police, army and ambulances were the only

vehicles allowed on the roads during the initial period of restrictions (trucks delivering commercial goods on a wholesale basis were allowed later on after a prolonged period of restricted movement led to shortages of essential goods). While water tanker drivers did experience a drop in demand for water deliveries to businesses, their livelihoods remained one of the least affected of any category of worker, except for police, army, and medical workers all of whom had more potential exposure to getting sick than most tanker drivers did (the drivers typically do not enter customers' homes when delivering water, while police and army were actively engaged in maintaining checkpoints and enforcing the lockdown by intervening physically against rule-breakers).

In addition to tanker drivers, medical staff and armed security personnel, a smaller group of entrepreneurs in the peri-urban areas whose businesses were never formally registered in the first place were more successful at finding ways to support themselves even during the period of heavy restrictions. One close contact who was friends and neighbors with Numa and Sita conveyed to me that both of them had managed to do a brisk business selling their homemade alcohol, and in Sita's case, fresh eggs on a take-away basis. Essential sales of food and water were only permitted officially during a very short window of time every day, but with all sales of alcohol from licensed shops strictly prohibited, small hole-in-the wall places run by longtime residents saw surges in demand for take-aways, especially in areas that were administered by rural rather than metropolitan police forces, as are some peri-urban spaces in the Kathmandu Valley. Though many of the small businesses run out

of people's homes in peri-urban neighborhoods have never formally registered with municipal authorities, they are typically well-known among local residents and generally fall outside the scope of formal regulation, provided that the operators that run them maintain a good reputation within the local community. Typically tax collection and the enforcement of municipal codes only occurs in larger, more upscale registered establishments in core urban neighborhoods, while a significant share of Nepal's rural and peri-urban small businesses operate in more of a grey area, well known locally and sometimes frequented by police and local officials, but in many cases unregistered and off the books when it comes to tax collection and the reporting of earnings.

While I had hoped to interview some of these respondents further before concluding my time in Nepal, by the time local regulations allowed for me to travel and conduct interviews locally, IRB approval for this research had already expired. Nonetheless, questions of how even and equitable the Kathmandu Valley's recovery turns out to be, along with questions over the equity impacts over the availability of Melamchi water both warrant further future investigation. As of the time of this writing, tourism remains the most depressed major sector of Nepal's economy, with occupancy and receipts down in most such ventures by 85-90% in January and February 2021 compared to the same months in 2020 (Nepal Immigration 2021; Nepal Tourism Board 2021). Though those working in this sector tend to earn incomes and possess wealth above the national average, hundreds of thousands of lower paid workers in this sector who were laid off have not been re-hired.

*Directions for future research on Melamchi Valley equity impacts*

A major area of focus for subsequent social scientific investigation will be how the transfer of Melamchi water impacts rural livelihoods and the agro-ecology of the Melamchi Valley itself. Initially I had planned to investigate such questions as a core component and chapter of this dissertation, but the iterative delays in bringing Melamchi water to Kathmandu that transpired during this fieldwork have made this an area to be addressed in closer detail by subsequent studies. One of the core proposals I had envisioned was to conduct research on agro-ecology and rural labor in villages both below and above the diversion site to gauge whether and how extensively the transfer of Melamchi water impacted the livelihoods of residents of the 17 Village Development Committees (VDCs) named as potentially impacted by the construction in earlier planning reports (ADB 2008; ADB 2020). Earlier scholarship has already highlighted rural protests that occurred during earlier planning stages of the MWSP to demand that agricultural irrigation systems be built in conjunction with tunnel construction, that the project include hydro-electric generation for Melamchi Valley residents and that more money be made available for additional infrastructure in the Melamchi Valley (Khadka and Khanal 2008; March, Domench and Sauri 2013). More recently, residents of the Melamchi basin, and of the neighboring Larke and Yangri rivers have expressed concerns that the flow of some natural springs were disrupted after the 2015 earthquake and that further water diversion could jeopardize local agriculture (Interview 11/26/2018; Interview 11/28/2018). Additional concerns have been raised even more recently that foreign

contracting firms have avoided paying agreed upon taxes to local government units (Kathmandu Post 3/31/2021). Further follow-up work to address any potential impacts of water diversions on local agriculture and to assess the needs of the residents of Melamchi Valley is needed once larger volumes of water begin flowing to Kathmandu in the near future.

Interviews and participant-observation conducted during three preliminary visits to the Melamchi Valley in 2017 and 2018 confounded some of the assertions and research questions I formulated prior to beginning the fieldwork. In an earlier proposal I suggested looking at water conditions and availability in particular villages based on whether they were located above or below the diversion tunnels near Ambathan, as viewed on a topographical map. In practice, however, many of the villages named in the earlier proposal rely primarily on spring water and/or smaller tributaries for household consumption and irrigation needs irrespective of where they are located relative to the diversion site. Above the diversion site, but also for the first several kilometers downstream from the tunnels, the Melamchi River banks are too steep to make the direct collection of water a realistic proposition in most places. Instead, spring water and smaller tributaries are channeled through hand-dug channels, and in some cases, small PVC pipes provide the primary source of household and irrigation water for many of the villages in question. Earlier feasibility studies and EIAs by foreign consultancies included significant work from hydro-



geologists, which concluded that the diversion of Melamchi water at the proposed site would likely have a limited impact on such springs (Binnie and Associates 1988; Stanley Associates 1994). Nonetheless, some residents of the valley claim that the flow of some of these springs was altered or disrupted after the 2015 earthquake and follow-up hydro-geologic studies of springs in these basins have not been conducted in many places since the earthquake.

Downstream residents who rely directly on Melamchi River water rather than springs or smaller tributaries tend to be larger landholders who live further downstream from the tunnels. One of the only large-scale diversions of river water I noticed in the Melamchi Valley itself came from a group of entrepreneurs who had established a large trout farm, using water diverted from the Melamchi River through concrete channels (Interview 11/26/2018). The owners of the fish farm sell their trout largely to wealthier residents from Kathmandu rather than to local Melamchi Valley residents (11/26/2018). Some larger paddy growing areas are also irrigated with Melamchi water, although these areas of flatter land are many kilometers downstream from the tunnels and after the Melamchi River is joined by several additional fast-moving tributaries. Further downstream, the Melamchi River joins the Indrawati River at Melamchi Bazar – the main market and commercial area of the valley. Several ghats are located along this stretch of river where bathing and cremations take place. These activities could potentially be impacted by any sharp drop in water levels, although given the large number of tributaries, waterfalls and springs between here and the diversion site, these areas appear to be far enough downstream to escape any major

direct impacts from water diversions, although ongoing water monitoring would help illuminate further any particular challenges faced by these downstream communities, along with climate change impacts. This valley is much wetter than the Kathmandu Valley as a whole, however, and has much lower population density so impacts in the short and mid-term may well be less extreme. An additional unknown is the impact of glacial melt on river levels, as the two rivers that meet in Melamchi Bazar are both glacial-fed. The most likely short and mid-term impact would be higher annual discharge as the glaciers slowly melt, but in the much longer-term a greatly reduced number of glaciers could lead to drops in annual discharge beyond the 50-year time horizon. Ongoing efforts to monitor snow and glacial melt would be beneficial to provide further baseline insights for subsequent social scientific studies of rural labor and agro-ecology in these river basins.

One preliminary finding from interviews conducted in 2017-18 is that recent social and political economic transformations in the Melamchi Valley have had even greater impacts on the livelihoods and practices of residents of the villages higher up the valley than in the downstream villages. The extension of a sealed access road to the site of the Melamchi tunnels was followed by further road construction connecting many of the villages higher up the valley to the national road network over the past decade. As a result, it is now possible for residents of villages in the upper reaches of the Melamchi Valley to reach Kathmandu in a single day, while buses and public transportation can reach some of these villages during the dry season months (Interview 10/1/2017; Interview 10/2/2017; Interview 11/26/2018). Even during the

monsoon, jeeps with four-wheel drive and motorcycles with high clearance can reach most settlements in the upper reaches of the Melamchi Valley, an area known as Helambu. This increased connectivity to nearby urban areas has led to profound transformations in the livelihoods of the Tamang and Hyolmo people of Helambu, with a sharp decline in yak herding and transhumance in recent years and an increase in the number of people in the community working as wage-laborers and traveling further afield for employment (Interview 10/1/2017; Interview 10/3/2017; Pokharel 2005; Pokharel 2010). Historically the Hyolmo and Tamang of Helambu, who say their ancestors migrated to the region from Tibet between 200 and 300 years ago, would engage in trans-Himalayan trade via yaks and other pack animals and would spend the summers grazing their animals in high alpine pastures, while growing potatoes, barley and buckwheat (Interview 10/1/2017; Interview 10/3/2017; Pokharel 2005; Pokharel 2010). More recently, many people of this region tend to spend their winters in the lowlands where they rent land from largely *Bahun* farmers to grow vegetables at a time of year when their own native villages freeze. A large number of such residents have also migrated to the city to work in sectors such as construction, manual labor and as taxi drivers both in the Kathmandu Valley, and further afield in India and the Gulf countries (Interview 10/1/2017; Interview 10/3/2017; Interview 11/28/2018; Pokharel 2010). As a result one of the most common household arrangements in the villages of Helambu is to have grandparents raising their grandchildren on their ancestral land, while both of the parents are away working as

wage-laborers only to return home for occasional holidays (Interview 10/1/2017; Interview 10/3/2017; Interview 11/28/2018).

While a few recent studies have looked at livelihoods and social arrangements in the upper Melamchi villages of Helambu, the prospect of less reliable spring water sources as a consequence of the 2015 earthquake, continued glacial retreat and of additional water diversions lends cause for further follow-up studies of households in this region. Chapagain, Ghimire and Shrestha's (2017) study of the broader basin area found that 18% of historical groundwater springs disappeared completely after the earthquake, while the water volume in roughly 30% of such springs has decreased over the past decade. Aase, Chapagain and Dangal's (2019) investigation of multi-sited Hyolmo households reveals how inter-regional ties between Hyolmo family members in Helambu villages and those earning wages or studying in the city complicates simple conceptual categories such as urban-rural, or even how a household is defined in the first place, with members of tightly-knit Hyolmo family units residing in different physical locations at different moments in the year, and at different stages of their lives, yet all contributing collectively to the development and transformation of rural life in Helambu. One common theme from these recent studies, however, is a shift away from traditional livelihood strategies and sources of sustenance, whether it's the abandonment of yak-herding in favor of growing paddy and winter vegetables in the lowlands, working as a MWSP construction laborer, or the growing number of young people from Helambu seeking jobs in Gulf countries and establishing more permanent residences outside of the region (Aase et. al 2019;

Chapagain et. al 2017; Pokharel 2005; Pokharel 2010). How outgoing water transfers, further infrastructure building and the drying up of historical sources of spring water shapes the social and agro-ecological changes already taking place here is a topic for subsequent research.

Although the first phase of MWSP tunnel construction is already complete and the urban water delivery system is currently undergoing testing, as of the time of this writing in April 2021, another question that is still outstanding is whether and when construction on the proposed extensions will take place, connecting the existing tunnels with the adjacent Larke and Yangri basins. Under the original plan, a second and third phase of the MWSP could potentially increase the amount of imported water to the Kathmandu Valley from 170 MLD to more than 500 MLD. This latter volume of water would be more than sufficient to meet the current daily demand of 360-400MLD consumed by the valley's urban residents, of which only 75-125 MLD is currently met by piped municipal supply, depending on the time of year (Global Water Forum 2017; KUKL 2019). The longest segment of tunnels in any phase of the project, as originally envisioned, are those connecting the Melamchi and Kathmandu Valley, with the tunnels required to connect the Melamchi Basin to the adjacent Yangri and Larke rivers less than one-third of the length of the original tunnels with a yield of additional water equivalent to the amount diverted in the original phase of the project. Nonetheless, there are no definitive plans to begin construction on the second phase of the project, and after the delays experienced in implementing the first phase there is no guarantee of how easy it would be for

planning authorities to secure additional financing. If the planning for the second phase of the project were to move forward another open-ended question for further research is whether the second phase could be implemented in a way that would generate additional co-benefits for rural communities outside of Kathmandu, given that there was initially strong resistance among Melamchi Valley residents that benefits from the infrastructure were not being shared equitably with residents on the Melamchi side of the tunnels.

Any potential future extension of the existing water diversion tunnels will likely be shaped and constrained both by pressures from above and pressures from below. Earlier construction on the original MWSP tunnels was constrained by the challenges of securing funding from international lending organizations and by the pressures of grassroots resistance, both among the Melamchi Valley villagers themselves and through the larger *Jana Yuddha* or Maoist People's War that engulfed the country shortly after financing had been approved to begin construction. Moreover, while current political leaders insist that debt-trap diplomacy is a foreign concept designed to instill psychological fear in the country's planners and policy-makers, the inconvenient fact remains that many existing loans for the MWSP must be repaid in US dollars, and that the exchange rate for the Nepal Rupee has shifted from 25 rupees to a dollar at the time the original project planning took place in the early 1990s to roughly 115 rupees to a dollar as of early 2021. The total cost of MWSP financing was \$464 million in year 2000 dollars, of which the Government of Nepal paid \$80 million up front (ADB 2007). While a small share of these funds was provided in the

form of grants, the bulk of this financing must be re-paid. Although a large share of foreign currency does flow into Nepal in the form of foreign labor remittances – the World Bank pegged such remittances a 28.4% of Nepal’s GDP in 2019 – it is politically unpopular to tax such remittances, while the ability of Nepalese laborers to migrate abroad for employment has diminished during the COVID-19 pandemic of 2020-21. The increasingly prominent role of Chinese state institutions and enterprises in financing projects in Nepal does provide an alternate pathway – and one that may not require payment in US dollars in the future – but how extensively China plays a role in financing and building future infrastructure in Nepal remains an open question.

In any case, the conversations I have had over the course of the fieldwork lend credence to the impression that Nepal’s own planners and policy-makers are not naive when it comes to the intentions of their larger neighbors, and that existing policy pivots toward China are based more off a desire to pit Nepal’s two larger neighbors against one another as they jockey for influence rather than an affirmation of one country’s model for development over another (Interview 5/14/2019; Interview 5/18/2019). Nonetheless, recent efforts by US officials in Nepal to articulate the extension of grants to build infrastructure through the prism of the Indo-Pacific Strategy have done more to raise alarm among Nepal’s political class than anything else. Given that a number of recent scholars have viewed the resurgence of authoritarianism in many lower-income countries as a specific rejection of western and US-backed models of development that come with too many strings and

conditions attached (Lekunze 2020; Mulmi 2021; Nandy 2020; Thapa 2016), practitioners and policy-makers based in the US, in particular, would do well to delve deeper into the specifics of particular cases to understand why Beijing's model of financing holds as much sway as it does among planners, even when its broader political model is largely unpopular in many countries where it pursues large-scale projects.

Regardless of how future projects like the MWSP tunnel extensions are financed, conscious and deliberate policy efforts will be needed to ensure the benefits are shared broadly and that the transfer of supplemental water can be sustained over the long-haul. The Government of Nepal has already taken many proactive steps toward affirming access to water as a human right to be enjoyed by all, such as the inclusion of Article 35, Clause 4 in the Constitution of 2015, which affirms the rights to clean drinking water and sanitation as human rights that can be denied to no citizen.

Historically, the Kathmandu Valley has been successful in maintaining an ancient system of public taps based on its own indigenous technologies that continue to supply household water to this day. Nonetheless, continued maintenance efforts will be needed to keep the water in this infrastructure flowing and to ensure that new projects and infrastructure produce tangible benefits for all residents. These challenges will be made greater by a changing climate, melting glaciers and changes in lifestyles, yet the water systems of the Kathmandu Valley have endured many past challenges and have proven to be remarkably adaptable to new waves of social and political change.



Regardless of the particulars of how the MWSP water deliveries unfold from here on out, Kathmandu Valley residents are likely to rely upon a variety of modalities for accessing household water for the foreseeable future. Even with the augmentation of subsidized, municipally-supplied water, many households will continue to fall outside the scope of the public network, while other households have already invested heavily in private and community-managed water infrastructure, making all three of these modes of water infrastructure and governance likely to co-exist in the Kathmandu Valley of the 21<sup>st</sup> century. Given the unpredictability of a rapidly warming, changing climate the prospect of having multiple sources of water available will likely increase the potential for household water security more than the reliance on any one project or source alone can. Nonetheless, ensuring that these sources of water are available for all who need them will require careful planning and attention to equity concerns. Similarly, ensuring that the ancient water infrastructure and systems that continue to supply water to so many households can survive will require careful planning, investment in maintenance, and conjunctive water management policies to promote groundwater recharge and the upkeep of the ancient reservoir ponds. Despite this, the existing water infrastructure of the Kathmandu Valley has continuously met the needs of the valley's residents for many centuries without interruption, and with the right planning and policies to ensure that these benefits are shared broadly, there is good reason to believe that these systems can continue to endure. Though urban societies as a whole face unprecedented climatic changes and challenges to their water systems, the existing water systems of the Kathmandu Valley have outlasted those of many

other societies and with careful planning and upkeep are as well-positioned as those anywhere to endure well into the future. Although future research is needed to assess whether the MWSP is a step in the direction of greater water justice, the existing water systems of the Kathmandu Valley carry great potential to enable residents to live lives they have reason to value, provided there is a continued emphasis on justice and that efforts are made to realize citizens' existing constitutional right to clean water and sanitation.

The case of inter-basin water transfers and urban water provision in the Kathmandu Valley of Nepal provides new insights into how ancient ingenuity and contemporary inter-basin transfers not only can coexist but can also provide additional layers of household water security against the specter of a changing climate. Excavating the deep and hidden histories of the Kathmandu Valley's native water systems also illuminates how development is and can be much broader and more expansive than a mere transition toward industrial modernity, emphasizing instead the multiplicity of pathways that can create the enabling conditions for human societies to lives of meaning and value. Moving from water transfers toward greater water justice, however, will require a more wide-ranging, multi-faceted approach to water provision, one that better links new infrastructure projects with existing dimensions and networks of water use and where a wider range of voices are heard and respected. The promotion and existence of multiple modes of water access and diverse forms of water governance carries the potential to achieve greater water equity and justice,

while also increasing the capacity of human societies to adapt and thrive even in the wake of an increasingly unpredictable climate.

### ***Works Cited***

- Aase, Tor H., Prem Chapagain and Hemanta Dangal. 2019. "Multi-sited Himalayan households and the misleading rural-urban dichotomy". *Himalayan Climate Change Adaptation Programme* (Kathmandu, Nepal).
- Acharya, Baburam. 2012. *Janarel Bhimsen Thapa: Yinko Utthan Tatha Pattan*. (Kathmandu, Nepal, Education Book House).
- Acharya, Baburam. 2013. *The Bloodstained Throne: Struggles for Power in Nepal (1775-1914)*. (New Delhi, India, Penguin Books India).
- Acharya, Baburam and Yogi Naraharinath. 2014. *Badamaharaj Prithvi Narayan Shah ko Divya Upadesh*. (Kathmandu, Nepal, Narayangadh Press and Study Centre).
- Adhikari, Aditya. 2014. *The Bullet and the Ballot Box: The Story of Nepal's Maoist Revolution*. (London, UK, Verso Publishing, New Left Books).
- Adhikari, Ashish. 2018. "Belt and Road Initiative and Nepal's Economic Perspective: Regionality and Specificity". *Kathmandu School of Law Review* 6 (1), pp. 41-52.
- Adhikari, Rojita. 2020. "Bringing an end to deadly "Menstrual Huts" is proving difficult". *BMJ Online* 368:m536, DOI:[10.1136/bmj.m536](https://doi.org/10.1136/bmj.m536).
- Amatya, Kipendra. 2020. "The MCC and Nepal's Strategic Ties with the US". *The Diplomat*. Feb. 19, 2020.
- Anand, Nikhil. 2015. "Leaky states: Water audits, ignorance and the politics of infrastructure". *Public Culture* 27 (2), pp. 305-330.
- Anand, Nikhil. 2017. *Water and the Infrastructures of Citizenship in Mumbai*. (Durham, NC and London UK, Duke University Press).
- Asian Development Bank, 2008. "Melamchi River Water Diversion, Sub-Project 1: Resettlement Action Plan" <https://www.adb.org/sites/default/files/project-document/76254/31624-nep-rp.pdf>, accessed 3/7/2021.
- Asian Development Bank, 2017. "Melamchi Water Supply Project". <https://www.adb.org/projects/31624-023/main>, accessed 8/19/2017.
- Bajracharya, Manu. 2007. *Nepali history as world history: Gorkhali state-building and national unification*. (Kathmandu, Nepal, Narayangadh Press and Study Centre).

- Bajracharya, Ramita, et. al. 2020. "Identifying Groundwater and River Water Interconnections Using Hydrochemistry, Stable Isotopes and Statistical Methods in Hanumante River, Kathmandu Valley, Central Nepal". *MDPI Water*, 12(1524), pp. 1-17.
- Bakker, Karen. 2003. "Archipelagos and networks: urbanization and water privatization in the South". *Geographical Journal* 169 (4), pp. 328-341.
- Bakker, Karen. 2003. "A political ecology of water privatization". *Studies in Political Economy* 70 (1), pp. 35-58.
- Bakker, Karen. 2007. "The 'Commons' Versus the 'Commodity': Alter-globalization, Anti-privatization and the Human Right to Water in the Global South". *Antipode* XX(X) pp. 430-455
- Bakker, Karen. 2013. "Constructing 'public' water: the World Bank, urban water supply, and the biopolitics of development". *Environment and Planning D.: Society and Space* 31 (1), pp. 280-300.
- Baral, Lok Raj. 1973. *Party-like Institutions in 'Partyless' Politics*. (Rotterdam, Netherlands, Rotterdam University Press).
- Baral, Lok Raj. 1995. "The 1994 Nepal Elections: emerging trends in party politics". *Asian Survey* 35 (5), pp. 426-440.
- Benner, Chris and Manual Pastor. 2015. "Whither Resilient Regions? Equity, Growth and Community". *Journal of Urban Affairs*, 38(1), 5-24.
- Bhandari, Medani. 2014. "Civil society and non-governmental organizations (NGOs) movements in Nepal in terms of social transformation". *The Pacific Journal of Science and Technology*, 15 (1), pp. 177-189.
- Bhattarai, Dinesh. 2019. "Understanding the Belt and Road Initiative". *Journal of APF Command and Staff College*. Vol 1, pp. 103-117.
- Binnie and Partners, Consulting Engineers. 1988. *Water supply for Kathmandu-Lalitpur from outside the valley: Pre-Feasibility Study*: London, UK.
- Bista, Dor Bahadur. 1991. *Fatalism and Development: Nepal's Struggle for Modernization* (Kathmandu, Nepal),
- Blomquist, William. 1988. "Getting out of the commons trap: variables, process and results in four groundwater basins". *Common Property Resources Management Conference*, (Bloomington, IN, Dec. 4-5, 1987).

Boelens, Rutgerd. 2013. "Cultural Politics and the Hydrosocial Cycle: Water, Power and Identity in the Andean Highlands". *Geoforum* 47(3). xxx-xxx

Boelens, Rutgerd, et. al. 2016. "Hydrosocial territories: a political ecology perspective". *Water International* 41 (1), pp. 1-14.

Brenner, Neil, David Madden and David Wachsmuth. 2011. "Assemblage urbanism and the challenges of critical urban theory". *Analysis of Urban Change: Theory, Action* 15 (2), pp. 225-240.

Chhetri, Samuel and Bhrikuti Rai. 2019. "Rapper's arrest is latest in government's attempt to crack down on free speech". *The Kathmandu Post*, Oct 24, 2019.

Chinnasamy, Pennan and Surendra Raj Shrestha. 2019. "Melamchi Water Supply Project: potential to replenish Kathmandu's groundwater status for dry season access:". *Water Policy* 21(2019) pp. 29-49.

Cole, Daniel H. and Michael D. McGinnis. eds. 2017. *Elinor Ostrom and the Bloomington School of Political Economy* (Lanham, MD, Lexington Books).

Constitution of Nepal. 2015.

Crow, Ben, Alan Lundquist, and David Wilson. 1995. *Sharing the Ganges: the politics and technology of river development*. (New Delhi, India, Sage Publications).

Crow, Ben and Nirvirkar Singh. 2009. "The Management of International Rivers as Demand Grows and Supply Tightens". *India Review*, 8(3), 306-339.

Crow, Ben and Edmond Odaba. 2010. "Access to water in a Nairobi slum: women's work and institutional learning". *Water International* 35 (6), pp. 733-747.

Dahal, Anjana, Rajendra Khanal and Binaya Kumar Mishra. 2019. "Identification of critical location for enhancing groundwater recharge in Nepal". *Groundwater for Sustainable Development* 2019 (9), Article 100253.

Dahal, Dev Raj. 1998. "Is there anything as "Good Governance" in Nepal? Reflections on the functioning of the civil society". *Local Self Government in Nepal* 1 (1), pp. 1-25.

Dahal, Dev Raj. 2002. "The current trade union situation in Nepal". *FES Global Trade Unions Coordination Meeting*, pp.1-14.

- Dahal, Dev Raj, Hari Uprety and Phanindra Subba. 2002. *Good governance and decentralization in Nepal*. (Kathmandu, Nepal, Center for Governance and Development Studies in cooperation with Friedrich-Ebert Stiftung).
- Dahal, Dev Raj and Tatwa P. Timisina. 2006. *Civil society in Nepal: Searching for a viable role*. (Kathmandu, Nepal, Institute for Cultural Affairs CIVICUS).
- Dahal, Kishor. 2016. “*Samjhanama Jana Andolan (046) srinkhala 1*” (सम्झनामा जनआन्दोलन ०४६ (श्रृंखला १)). In memory of the first People’s Movement. (Kathmandu, Nepal, Nepal Live).
- Dasgupta, Rajarshi. 2005. “Rhyming revolution: Marxism and culture in colonial Bengal”. *Studies in History* 21 (1), pp. 79-98.
- Dhunhgana, Menuka. 2018. “Woman dies in Chhaupadi practice”. *The Kathmandu Post*, January 9, 2018.
- Domenech, Laia, Hug March and David Sauri. 2013. “Contesting large-scale water supply projects at both ends of the pipe in Kathmandu and Melamchi Valleys, Nepal”. *Geoforum* 47 (1), pp.22-31.
- Dongol, Robert, et. al. 2012. “Overview of Water Markets in the Kathmandu Valley”. *Kathmandu Valley Groundwater Outlook* (Yamanashi, Japan, Asian Institute of Technology).
- Doss, Cheryl R. and Ruth Meinzen-Dick. 2015. “Collective Action within the Household: Insights from Natural Resource Management”. *World Development* 74 (1), pp. 171-183.
- Dutt, Nalinaskha. 1966. “Buddhism in Nepal”. *Bulletin of Tibetology* 3 (2), pp. 27-45.
- Escobar, Arturo. 1995. *Encountering Development: The Making and Unmaking of the Third World*. (Princeton, NJ, Princeton University Press).
- Escobar, Arturo. 2017. *Designs for the Pluriverse*. (Durham, NC, USA, Duke University Press).
- Fujikura, Tatsuro. 2014. “Tharus are models for new Nepal”. *Spotlight Nepal* Sep. 12, 2014 8(7).
- Ghimire, Binod. 2019. “Criminal code “ineffective” to end Chhaupadi practice”. *The Kathmandu Post*, Jan. 25, 2019.

- Ghimire, Yubaraj. 2015. "Next door Nepal: Blaming it on India". *New Indian Express*. Sep. 24, 2015.
- Goff, Matthew and Ben Crow. 2014. "What is water equity? The unfortunate consequences of a global focus on 'drinking water'". *Water International* 39 (2), pp. 159-171.
- Government of Nepal, 2017. "Melamchi Water Supply Development Board". <http://www.melamchiwater.gov.np/>, accessed 8/18/2017.
- Government of Nepal - Ministry of Water Supply and Sanitation, 2017. "Melamchi Water Supply Project" <http://mowss.gov.np/content/melamchi-water-supply-project.html>, accessed 8/18/2017.
- Guha, Ramachandra. 1989. *The Unquiet Woods: Ecological Change and Peasant Resistance in the Himalaya*. (Delhi, India, Oxford University Press India).
- Gurubacharya, Binaj. 2010. "Maoists in Nepal lead strike to force government to quit". *Associated Press* May 3, 2010.
- Gurung, Satish. 2015. "A Nepalese student explains #Back Off India". *The Quint Magazine*, Sep. 30, 2015.
- Gurung, Yogendra, et. al. 2017. "The costs of delay in infrastructure investments: A comparison of 2001 and 2014 household water supply coping costs in the Kathmandu Valley, Nepal". *Water Resources Research* 53 (8), pp. 7078-7102.
- Harvey, David. *A Brief History of Neoliberalism*. (Oxford, UK, Oxford University Press).
- Himalayan News Service. 2015. "Blockade more damaging than quake". *The Himalayan Times*, Dec. 11. 2015.
- Houweling, Emily v. et. al. 2012. "The Role of Productive Water Use in Women's Livelihoods: Evidence from Rural Senegal". *Water Alternatives* 5 (3), pp. 658-677.
- Hutt, Michael. 2017. "The Royal Family Massacre: Conspiracy Theories and Nepali Street Literature". (London, UK, SOAS University).
- Ishtiaque, Asif, Milan Shrestha and Netra Chhetri. 2017. "Rapid Urban Growth in the Kathmandu Valley, Nepal: Monitoring Land Use Land Cover Dynamics of a Himalayan City with Landsat Imageries". *Environments* 4(4) 72.



- Jaglin, Sylvie. 2002. "The right to water versus cost recovery: participation, urban water supply, and the poor in Sub-Saharan Africa". *Environment and Urbanization* 14 (1), pp. 231-245.
- Joy, K.J., et. al. 2014. "Re-politicising water governance: exploring water allocations in terms of justice". *Local Environment* 19 (9), pp. 954-973.
- Kaur, Sandeep. 2019. "Judicial systems in ancient India: A review". *Asian Journal of Multi-dimensional Research* 8 (5), pp. 190-200.
- Khadka, R.B. and A.B. Khanal. 2008. "Environmental Management Plan (EMP) for Melamchi Water Supply Project, Nepal". *Int. J. Environ. Res.* 2(1), pp.87-96.
- Khanal, Krishna and Krishna Hachethu. 1999. "Resistance and the state in Nepal". *The Journal of Asian Studies* 59 (1), pp. 86-108.
- Khanal, Rajendra. 2019. "Linguistic geography of Nepalese languages". *The Third Pole: Journal of Geography Education.* 18 (1), pp. 45-54.
- Kharel, Pranab and Gaurab KC. 2018. *Locating Nepalese Mobility: A Historical Re-appraisal with Reference to North-east India, Burma and Tibet.* (Kathmandu, Nepal, Kathmandu School of Law).
- Lama, Jimmy. 2016. "Solukhumbu and Helambu Earthquake Appeal". *Helambu Education and Livelihood Programme.*
- Lamichhane, Suraj and Narendra Man Shakya. 2019. "Alteration of groundwater recharge areas due to land use/land cover change in the Kathmandu Valley, Nepal". *Journal of Hydrology: Regional Studies* 26 (1), Article 100635.
- Lamichhane, Suraj and Narendra Man Shakya. 2020. "Shallow aquifer groundwater dynamics in highly urbanized basin: the case of Kathmandu Valley". *Journal of Hydrology: Regional Studies* 30 (1), Article 100707.
- Lawoti, Mahendra and Anup Kumar Pahari. 2010. *The Maoist Insurgency in Nepal: Revolution in the Twenty-First Century.* (London, UK and New York, USA, Routledge).
- Lees, David, Niaz Ahmad and Ghanashyam Bhattarai. 2015. "The Melamchi Water Supply Project". *Seventh Nepal Geological Conference.* Kathmandu, Nepal.
- Lu, Flora, Constanza Ocampo-Raeder, and Ben Crow. 2014. "Equitable water governance: future directions in the understanding and analysis in water inequities in the global South". *Water International* 39 (2), pp. 129-142.

- Mainali, Sujit. 2015. "How discriminatory was the first *Muluki Ain* against Dalits?". *South Asia Check*. 2015 (1) pp. 252-357.
- Mandal, Chandan, Kumar. 2019. "Nepali bureaucrats regularly asked for their cut from contractors, Italian officials say". *The Kathmandu Post*, Mar. 21, 2019.
- Mehta, Pratap Bhanu. 2015. "Kathmandu nights". *The Indian Express*. Dec. 8, 2015.
- Molden, Olivia, Anoj Khanal and Nita Pradhan. 2020. "The pain of water: a household perspective of water insecurity and inequity in the Kathmandu Valley". *Water Policy* 22 (s1), pp. 130-145.
- Mollinga, Peter. 2013. "Canal Irrigation and the Hydrosocial Cycle: The Morphogenesis of Contested Water Control in the Tungabhadra Region of India", *Geoforum* 46 (7), xxx-xxx.
- Morales, Margaret C. and Leila M. Harris. 2014. "Using Subjectivity and Emotion to Reconsider Participatory Natural Resource Management". *World Development* 64, pp. 703-712.
- Mosse, David. 2010. "A Relational Approach to Durable Poverty, Inequality and Power". *Journal of Development Studies*. 46 (7), pp. 1156-1178.
- Mulmi, Amish Raj. 2021. *All roads lead north: Nepal's turn to China* (London, UK, Hurst Publishers).
- Mulmi, Amish Raj. 2021. "Losing trust in the Republic". *Kathmandu Post*, May 13, 2021.
- Murthy, Sharmila. 2013. "The Human Right(s) to Water and Sanitation: History, Meaning and the Controversy over Privatization". *Berkeley Journal of International Law* 31 (1), pp. 89-147.
- National Railway Administration of the People's Republic of China. 2018. "Review meeting of pre-feasibility study report on China-Nepal cross-border railway". [http://www.nra.gov.cn/xwzx/gjjl/wsd/201808/t20180824\\_64334.shtml](http://www.nra.gov.cn/xwzx/gjjl/wsd/201808/t20180824_64334.shtml), accessed 2/21/2021.
- Nepal Census 1971, Population- Central Bureau of Statistics. <https://cbs.gov.np/>
- Nepal Census 1981, Population- Central Bureau of Statistics. <https://cbs.gov.np/>
- Nepal Census 1991. Population-Central Bureau of Statistics. <https://cbs.gov.np/>

- Nepal Census 2001. Population-Central Bureau of Statistics. <https://cbs.gov.np/>
- Nepal Census 2011, Population-Central Bureau of Statistics. District level data-sets available: <https://cbs.gov.np/> and <https://data.humdata.org/dataset/nepal-census-2011-district-profiles-demography>, accessed 3/14/2021.
- Nightingale, Andrea J. 2002. "Participating or Just Sitting In? The Dynamics of Gender and Caste in Community Forestry". *Journal of Forest and Livelihood*. 2 (1), pp. 1-8.
- Nightingale, Andrea J. 2011. "Bounding difference: Intersectionality and the material production of gender, class, caste and environment in Nepal". *Geoforum* 42 (2), pp. 153-162.
- Neupane, Nilhari. 2015. *Water and Culture in Nepal* (Kathmandu, Nepal, Kantipath Publishing).
- Neupane, Nilhari. 2019. *Traditional and Modern Water Systems of the Kathmandu Valley*. (Kathmandu, Nepal. Narayangadh Publo
- Olivelle, Patrick. 2005. *Manu's Code of Law*. (Oxford, UK, Oxford University Press).
- Ostrom, Elinor. 1965. "Public Entrepreneurship: A Case Study in Ground Water Basin Management". Doctoral Dissertation, Department of Political Science, University of California-Los Angeles.
- Ostrom, Elinor. 1990. *Governing the Commons: The Evolution of Institutions for Collective Action*. (Cambridge, UK, Cambridge University Press).
- Ostrom, Elinor. 1999. "Collective Action and the Evolution of Social Norms". Prepared for *Workshop in Political Theory and Policy Analysis* (Bloomington IN, Indiana University – Center for the Study of Institutions, Population and Environmental Change).
- Ostrom, Elinor. 2014. "Do institutions for collective action evolve?" *Journal of Bioecon* 16 (1), pp 3-30.
- Pacheco-Vega, Raul. 2020. "Using Ethnography in Comparative Policy Analysis: Premises, Promises and Perils". *Handbook of Research Methods and Applications in Comparative Policy Analysis* (Cheltenham, UK, Edward Elgar Publishing).

- Parajuli, Rishi Ram and Junji Kiyono. 2015. "Ground motion characteristics of the 2015 Gorkha earthquake: Survey of damage to stone masonry structures and structural field tests". *Frontiers in Built Environment* 23 (1).
- Paudel, Dinesh. 2016. "Ethnic identity politics in Nepal: liberation from, or restoration of, elite interest?". *Asian Ethnicity* 17 (4), pp. 548-565.
- Perreault, Tom. 2014. "What kind of governance for what kind of equity? Towards a theorization of justice in water governance". *Water International* 39 (2), pp. 233-245.
- Pokharel, Binod. 2010. "Changing Relations between High Castes and Tamang in Melamchi Valley". *Dhaulagiri Journal of Sociology and Anthropology* Vol (4) pp. 65-84.
- Pokhrel, Lok. 2017. *Ancient dynasties of the Kathmandu Valley: from the Lichchavis to the Mallas*. (Kathmandu, Nepal, Center for the Advanced Study of Nepal).
- Poteete, Amy R. and Elinor Ostrom. 2004. "Heterogeneity, Group Size and Collective Action: The Role of Institutions in Forest Management". *Development and Change* 35 (3), pp. 435-461.
- Poudel, Keshab. 2021. "Melamchi story from King Birendra, NC Leader Bhattarai and PM Oli". *Spotlight Nepal*, April 2, 2021, 14 (15).
- Poudyal, Ritu. 2019. "Learning from the Challenges of the Melamchi Water Supply in Kathmandu". *Asian Development Bank Institute*. Case Study No. 2019-2.
- Pradhan, Kumar. 1991. *The Gorkha Conquests: The Processes and Consequences of the Unification of Nepal, with Particular Reference to Eastern Nepal*. (Oxford, UK, Oxford University Press).
- Pradhan, Kumar. 2012. *Thapa Politics in Nepal: with Special Reference to Bhimsen Thapa 1806-1839*. (New Delhi, India, Concept Publishing Company).
- Pradhan, Sneha. 2018. "Contemporary land issues in the Federal Democratic Republic of Nepal". *Samriddhi Foundation Nepal*, pp. 1-14.
- Prakash, Anjal and David Molden. 2020. "Mapping challenges for adaptive water management in Himalayan towns". *Water Policy* 22(s1), pp. 1-8.
- Prakash, Anjal and David Molden. 2020. *Water in Himalayan Towns: Lessons for Adaptive Water Governance*. (London, UK, IWA Publishing).
- Puri, B.N, and M.M Das. 2003. *Comprehensive History of Ancient India*. (New Delhi, India, Sterling Press Pvt. Ltd.).

- Ranganathan, Malini. 2014. "‘Mafias’ in the waterscape: Urban informality and everyday public Authority in Bangalore". *Water Alternatives*. 7 (1), pp. 89-105.
- Ranganathan, Malini. 2014. "Paying for pipes, claiming citizenship: Political agency and water reforms at the urban periphery". *International Journal of Urban and Regional Studies* 38 (2), pp. 590-608.
- Ranganathan, Malini. 2015. "Storm drains as assemblages: The political ecology of flood risk in post-colonial Bangalore". *Antipode* 47 (5), pp. 1300-1320.
- Ranganathan, Malini and Carolina Balasz. 2015. "Water marginalization at the urban fringe: environmental justice and urban political ecology across the North-South divide". *Urban Geography* 36 (3), pp.403-423.
- Rest, Matthäus. 2018. "Dreaming of pipes: Kathmandu’s long-delayed Melamchi Water Supply Project". *Environment and Planning C: Politics and Space* 37 (7), pp. 1198-1216.
- Rest, Matthäus and Alessandro Rippa. 2019. "Road animism: reflections on the life of infrastructures". *HAU Journal of Ethnographic Theory* 9 (2).
- Sapkota, Rupak. 2019. "Nepal in the Belt and Road: New Vista in Building a China-India-Nepal Economic Corridor". *China International Studies: China Academic Journal Electronic Publishing House*. pp. 104-121.
- Savada, Andrea Matles. 2002. *Nepal and Bhutan: country studies*. (Washington D.C., USA, Federal Research Division: Library of Congress).
- Schlosberg, David. 2004. "Reconceiving Environmental Justice: Global Movements and Political Theories". *Environmental Politics* 13 (3), pp. 517-540.
- Schlosberg, David. 2013. "Theorising environmental justice: the expanding sphere of a discourse". *Environmental Politics*. 22 (1), pp. 37-55.
- Sen, Amartya. 1999. *Development as Freedom* (New York, NY, Alfred Knopf).
- Sewell, J. and J. Debrett. 1796. *Institute of Hindu Law: Ordinances of Menu*. (Calcutta (sic), India, Printed by order of His Majesty’s Government). Accessed <https://catalogue.wellcomelibrary.org/> ... 5/13/2019).
- Sharma, Jeevan Raj and Andrea J. Nightingale. 2014. "Conflict resilience among community forestry user-groups: experiences in Nepal". *Edinburgh Research Explorer* 38 (3), pp. 517-539.

- Shrestha, Ananda. 1998. *The role of civil society and democratization in Nepal*. (Kathmandu, Nepal, Nepal Foundation for Advanced Studies in cooperation with Friedrich-Ebert Stiftung).
- Shrestha, Anushiya, Dik Roth and Deepak Joshi. 2018. “Flows of change: Dynamic water rights and water access in peri-urban Kathmandu”. *Ecology and Society* 23 (2) pp. 42-59.
- Shrestha, Anushiya, Deepak Joshi and Dik Roth. 2020. “The hydro-dynamics of water exclusion and insecurity of Dalits in peri-urban Kathmandu Valley, Nepal: fluid yet unchanging”. *Contemporary South Asia* 3 (1), pp. 320-335.
- Shrestha, Arpan. 2018. “Kathmandu’s roads are widening, but there’s no space for pedestrians”. *Kathmandu Post* Dec. 22, 2018.  
<https://kathmandupost.com/valley/2018/12/22/kathmandus-roads-are-widening-but-theres-no-space-for-pedestrians>, accessed 3/27/2020.
- Shrestha, Asmita, et. al. 2020. “Nutritional status of children and its associated factors in selected earthquake-affected VDCs of Gorkha District, Nepal”. *International Journal of Pediatrics*. Article ID 5849548 |
- Shrestha, Sadhana et. al. 2017. “Dynamics of domestic water consumption in the urban area of the Kathmandu Valley: Situation Analysis Pre- and Post 2015 Gorkha Earthquake”. *MDPI Water*, pp. 1-17.
- Shrestha, Sarita. 2019. “Dhading farmers protest fertilizer shortage”. *MyRepublica*, June 3, 2019. Accessed 3/30/2021  
<https://myrepublica.nagariknetwork.com/news/dhading-farmers-protest-fertilizer-shortage/>
- Shrestha, Sobha, Prem Sagar Chapagain and Motilal Ghimire. 2019. “Gender perspective on water use and management in the context of climate change: a case study on the Melamchi Watershed area, Nepal”. *Sage Open*, pp. 1-9.
- Singh, Upinder. 2010. *Ancient India: New Research*. (New Delhi, India, Oxford India Press).
- Srikantan, Geetanjali. 2014. “Entanglements in Legal History: Conceptual Approaches. Re-thinking Hindu law through Weber’s sociology of religion.”. *Max Planck Forum for Legal History* (Berlin, Germany, Max Planck Institute).
- Srivastava, Nagendra Lal. 2008. “Major Turns in Planned Development of Nepal”. *The Journal of Nepalese Business Studies*. V (1), pp.1-15.
- Sultana, Farhana and Alex Loftus. 2013. *The Right to Water: politics, governance and social struggles*. (London, UK and New York, NY. Earthscan).

- Swyngedouw, Erik. 2004. *Social Power and the Urbanization of Water: Flows of Power* (Oxford, UK, Oxford University Press).
- Swyngedouw, Erik. 2009. "The Political Economy and Political Ecology of the Hydrosocial Cycle" *Journal of Contemporary Water Research and Education* 142(1), pp. 56-60.
- Swyngedouw, Erik. 2015. *Liquid Power: contested hyrdo-modernities in twentieth century Spain*. (Boston, MA, M.I.T. Press).
- Thapa, Bhesh Raj, et. al. 2018. "Evaluation of water security in Kathmandu Valley before and after water transfer from another basin". *Water* 10 (2), <https://doi.org/10.3390/w10020224>.
- Thapaliya, Ram Sharan. 2019. "The Role of Nepalese Political Parties in Democracy: 1990-2018" *Research Nepal: Journal of Development Studies* 2(2), pp. 142-161.
- Timisina, Netra Prasad, et. al. 2020. "Trend of urban growth in Nepal with a focus in Kathmandu Valley: A review of processes and drivers of change". *Tomorrow's Cities Publications*, <http://dx.doi.org/10.7488/era/722/>
- Tiwari, Sudarshan Raj. 2016. "The pit-conduit water supply system of Kathmandu" published at: <https://web.archive.org/web/20210322165441/http://www.kailashkut.com/wp-content/uploads/2016/05/the-pit-conduit.pdf> (accessed 3/23/2021).
- Truelove, Yaffa. 2011. "(Re-) Conceptualizing water inequality in Delhi, India through a feminist political ecology framework". *Geoforum* 42 (2), pp. 143-152.
- Tsepon, Wangchuk and Deden Shakabpa, 2010. *One Hundred Thousand Moons: An advanced political history of Tibet*. (Leiden. Netherlands, Brill Publishers).
- Tuladhar, Prateebha. 2020 "Quarantine Kathmandu style: a history of a Newari practice". *Kathmandu Arts and Culture* 2 (2) pp.5-14.
- United Nations, World Population Prospects. 2019. "Department of Economic and Social Affairs: Population Dynamics". <https://population.un.org/wpp> (accessed 4/2/2021).
- Upadhyaya, Sanjay. 2012. *Nepal and the Geo-Strategic Rivalry between China and India*. (London, UK, Routledge).

Upadhyay, Rachana and Mark Pelling. 2020. "Tomorrow's resilient Kathmandu: Report on Imagining Futures workshop". *Tomorrow's Cities Publications* <https://era.ed.ac.uk/handle/1842/37532>, accessed 3/21/2021.

Upreti, Bishnu Raj. 2010. *The re-make of a state: post-conflict challenges and state-building in Nepal*. (Kathmandu, Nepal, Nepal Centre for Contemporary Research).

Varughese, George. 1999. "Villagers, Bureaucrats and Forests in Nepal: Designing Governance for a Complex Resource". Doctoral Dissertation, Indiana University, Bloomington.

Varughese, George and Elinor Ostrom. 2001. "The Contested Role of Heterogeneity in Collective Action: Some Evidence from Community Forestry in Nepal" *World Development* 29 (5), pp. 747-765.

Zwartveen, Margreet Z. and Rutgerd Boelens. 2014. "Defining, researching and struggling for water justice: some conceptual building blocks for research and action". *Water International* 39 (2), pp. 143-158.