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From Holy to Holistic: Working Towards Integrated Management of the Bagmati River Corridor

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Abstract

The Bagmati and its tributaries have been an integral part of the Kathmandu Valley civilization. The river not only became a source of sustenance for the Valley's population but also gained religious-cultural significance. However, rapid urbanization and increasing industrial activities have transformed this once pristine river into an open sewer. Governmental organizations, NGOs, and community members are working towards improving the conditions of the Bagmati River through restoration projects and public awareness campaigns. Because of the large number of actors, collaboration on projects is vital in order to avoid duplication or conflict. After nearly thirty years of failed restoration projects and overall lack of improvement to the Bagmati River Corridor, my research asks two questions, who should hold the authoritative power over the rehabilitation of the Bagmati River Basin? How can these institutions be restructured to be more effective in their implementation? By investigating the ways in which these actors are collaborating on the restoration and reclamation of the Bagmati River and how these actors' definitions of development and goals for development projects align; I can assess the effectiveness on some of the projects in progress. From my research, I suggest that larger institutional changes need to be made in order for restoration of the Bagmati to succeed. This involves creating a representative body to include a greater variety of voices in decision-making. Moreover, a multi-institutional approach to restoration has the potential to be a more effective method due to the instability of Nepal's central government.

Keywords: Water Resource Management, Sustainability, Environmental Studies

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Table of Contents

Introduction

Walking across the bridge that connects Patan and Kathmandu, I had to consciously plug my nose to avoid choking on the stench. The view from the bridge left me in utter disappointment. To the right was a sprawling field of makeshift metal homes and to my left was stagnant water with garbage floating on the surface. Below the bridge "flows" the Bagmati River, the second most sacred river in Hinduism, but from my perspective, one of the dirtiest I have ever seen.

The Bagmati River originates just below the Shivapuri Hill, northeast of Kathmandu. Seasonal monsoon rainfall and a number of springs and tributaries feed the river as it flows into the Kathmandu Valley (NWCF and NTNC 2009). This river basin serves as a highly valued natural resource as well as a prime location for human settlements. Additionally, the Bagmati River serves as significant cultural heritage site with many important shrines, temples, Ghats, etc. situated along its banks (NWCF and NTNC 2009). With rampant population growth and urban expansion within the Kathmandu Valley beginning in the 1950s, the Bagmati River banks have experienced severe degradation. At present, the Bagmati has been used for a variety of purposes ranging from sand extraction to a dumping ground for all kinds of waste. These activities have caused the water quality and religious and cultural heritage sites along the riverbanks to quickly deteriorate (NTNC 2008). Many studies and project proposals that assess the deteriorating state of the sacred river have failed to achieve any visible or biological improvement. Therefore,

it is necessary to examine why past projects have been continuously futile, and the ways in which methods, collaboration and implementation strategies can be improved.

The Rise and Fall of the Bagmati Civilization

Between the 12th and 18th centuries, Kathmandu Valley developed as a cultural mecca under the rule of the Mallas (Images of a Century). The 220 mile-square radius Valley provided fertile agricultural land, making it a desirable place for settlements. Due to its centrality, it grew to become the heart of trade and commerce between the Ganga plain and Central Asia. A unique feature of the Kathmandu Valley is the Bagmati River Basin, which is a complex system of rivers and riparian areas that flows down from the Himalayan Mountain range. Depicted in Figure 1, the Bagmati River is the principal river of the Bagmati Basin, which is about 3638 km2 (Paudel). The Bagmati River, serves as one of the most sacred rivers for Hindus. Many shrines, temples, and Ghats line its banks, the most notable one being Pashupatinath temple (Figure 2). Given the abundance of natural resources that the Kathmandu Valley offers, it is no wonder that the valley transformed into a center for agricultural, cultural, and religious significance.

When the first ruling class, the Lichivi's, arrived in the Kathmandu Valley in the 1st century AD, they established an innovative water harvesting technology (Conner 2012). Instead of relying on the river for drinking water, they developed a deep pit system that harvested water from the regions hills. This system collected water from other sources without compromising the

valley's water table or waterways. This system was established in the 5th century AD and has remained in practice into the 20th century (Conner 2012). As the demand for water has grown, the city has curtailed its policy to rely mainly on diverting water for drinking purposes. The diversion of the river's fresh water north of the city has significantly diminished the Bagmati's once abundant flow. Nepal now straddles the line between traditional and modern technologies, where traditional methods are being phased out, but modern systems have yet to function properly.

Before the mid 20th century, strict migration policies restricted the movement in and out of the Kathmandu Valley (Rademacher 2007). Beginning with the overthrow of the Rana oligarchy in 1951, and in its place a budding democracy, mass migration and urbanization of the Valley occurred (Figure 3). For example, from1981 to 1991, the valley's urban population increased by 82%, of which migration accounted for 59% (Dahal, Khanal, and Ale 2011). Within the past 60 years, the population grew from nearly .41 million people in 1951 to around 2.6 million in 2011 (Dixit and Gyawali 2011). A study conducted by Lumanti in 2003, found that there are 64 squatter settlements, with an estimated population of 14,500. Most of these settlements occupy private and public land along the river, creating tension between squatters and the owners (Dahal, Khanal, and Ale 2011). A consequence of the large transient population and unmonitored development, Kathmandu has become a concrete jungle and in turn is changing the character of the city and the river. The once fertile agricultural lands have transformed into a

homogeneous, human dominated landscape. And the once biologically diverse river system has been reestablished as an informal waste dumping ground.

With the increase of employment and economic opportunities in the city beginning in the 1970s, the pace of migration to the city intensified (Sada, 2010). The city's economic prosperity led to the production of industry, factories, and housing encroachment along the banks of the Bagmati (Sada, 2010). As a quickly growing city and little infrastructure to support the increasing population many projects that are necessary for a healthy city fell to the wayside, including sewage systems, wastewater treatment plants, and natural resource management. Unfortunately, these missteps in the process and narrow concentration on economic development resulted in the increasingly toxic water and a biologically dead river. The lack of linear progression in the development of the Kathmandu Valley, with a narrow focus on the growth of the economic and industrial sectors has had a lasting impact on its urban form and the environment. Because of this, many organizations are working towards changing the way development is perceived around the Bagmati River to make it more environmentally conscious and sustainable.

As Kathmandu's borders opened to an increased population, it simultaneously embraced commercialization and industrialization. Additionally, social and economic development, an aspect of the Panchayat system, resulted in the centralization of power and money within the Kathmandu Valley, thus making Kathmandu the heart of commerce, business, education, and politics (Images of a Century). Its over-centralization has encouraged people to come to the Valley with absolutely no ties to the city,

river, or the Bagmati civilization, consequently leaving an environmental mess in their wake.

Key Issues of the Bagmati River Basin

The centralization of the Kathmandu Valley and its sustained population growth are only a couple of the numerous reasons for the decline of the Bagmati River Corridor. Dahal et al. (2011) indicates that the indirect and direct drivers behind the degradation of the Bagmati include population growth, urban growth and expansion, agricultural development, solid waste, and ineffective enforcement of laws and regulations as significant contributors to the fall of the Bagmati Civilization.

Since the Bagmati is a seasonally fed river, seasonal monsoon rainfalls and springs replenish it. As a result, there is a wide seasonal variation in its flow and quality. In the annual rainfall in the basin is 1400mm, while it is above 2000mm in the hills (Figure 4) (Dixit and Gyawali 2011). The assumption that the "solution to pollution is dilution" (Ganesh Shah) does not hold true for the Bagmati. Due to seasonal rainfall and large amounts of its water being diverted by private households, corporations, hotels, industry, and irrigation, the flow is not what it used to be. The mean annual flow is 15.6 m^3/s. The flow is highest in the months of July and August with a maximum discharge of 195 m^3/s, while the flow decreases to a minimum monthly flow of .51m^3/ s in April (Dixit and Gyawali 2011). As of now, the flow is so low that it cannot flush away waste, thus the river is predominantly grey and black

water. As increased discharge from factories and private homes flow into the dry Bagmati riverbed, the river scape becomes a cesspool.

The amount of dissolved oxygen (DO) and Biological Oxygen Demand (BOD) in water are used as indicators to determine the health of rivers (Dahal, Khanal, Ale 2011). Many studies have analyzed the physical makeup and biological indicators of the Bagmati River (Stanley et al. 1994; Poudel and Upadhaya 1995; Sharma et al 2005), and they have found that as the Bagmati River flows through the core area of the Kathmandu Valley it becomes increasingly degraded (Figure 5). A study by UNEP (2001) found that since 1994, the Bagmati has been highly polluted as indicated by a high BOD and low DO levels, because of a high concentration of domestic and industrial discharge. Fortunately, it has been found that the Bagmati River's tributaries that lie outside of the valley are still in good condition and can be used for a variety of purposes (Dahal, Khanal, Ale 2011).

A report on the Bagmati Basin Water Management Strategy and Investment Program (Stanley et al. 1994) pronounced the Bagmati River water within the Kathmandu Valley as not suitable for drinking, recreational use, and irrigation purposes. The direct discharge of liquid and solid waste has been argued as the main contributor to the rivers demise. Around 21,000 Kg per day of domestic sewerage is discharged into the Bagmati, while about 3,151kg of industrial waste flows into the river daily (CEMAT 2001). Private companies and NGOs have started small-scale initiatives to manage the liquid and solid waste being deposited into the river. For example, the NGO, Women's Environmental Preservation Committee (WEPCO) focuses on the

collection and disposal of solid waste in the Lalitpur district. They have also introduced successful recycling and composting programs for households and businesses.

Lastly, riverbank encroachment ranging from sand extraction to squatter populations has contributed to the river's degradation. The housing boom and rapid expansion of the urban center has had a major impact on the Bagmati (NWCF and NTNC 2011). As new roads and buildings are built along the river, these permeable surfaces prevent water from recharging the aquifers. Furthermore, data collected in 2010 found that there are 80 squatter settlements in Kathmandu alone, housing around 20,000 people (Conner 2012). Officials have framed squatter settlements as an obstacle to river restoration, since they occupy public space that could be used for green space or construction are for sewerage lines (Rademacher 2011). Lastly, sand extraction from the riverbed for the construction of buildings has led to the deepening of the Bagmati to at least 2 or 3 meters below the original level, consequently reducing the groundwater table (NWCF and NTNC 2011).

Proposals for projects to tackle these key issues include a dry toilet system, dam construction, an iron net along the riverbank, constructed wetlands, sewerage lines, and wastewater treatment centers (Dahal 2000; Regmi). In 2001, the HPCIDBC finished constructing a wastewater treatment plant in Guheswari (NWCF and NTNC 2011). According to Dixit (2011), the plant is only partially functioning, while other sewerage treatment plants have been abandoned. This leads to questions regarding the near and long-term sustainability of the treatment plants.

Collective Response to the Declining Conditions of the Bagmati

Since the 1990s, there has been recognition of the Bagmati River's dire condition and nearly a hundred organizations have formed to try and save what is left of the deteriorating river and its surrounding religious and cultural monuments (Rademacher 2007). Development projects such as the UN Park, the formation of the Bagmati Nature Park, the construction of wastewater treatment plants and sewage lines, and the Bagmati Cleanup Mega Campaign have been successful at increasing awareness about the river's dire condition and cleaning up sections of the river, but little substantial progress has actually been achieved due to an inefficient government, lack of coordination, capacity, and funding.

In the 1970s the Nepali government received a loan from the World Bank with the purpose of improving the quality of drinking water and sewage system in Kathmandu (Bhaduri, 2012). As river improvement projects failed to be implemented, public pressure on the Government increased. In response, the Pokhryal Commission was formed in 1986 to evaluate and recommend changes to water management; yet again, improvement never came (Bhaduri, 2012).

The early 1990s brought many promising studies on the Bagmati, but the most popular among officials was the Bagmati Basin Management Strategy (BBMS) published in 1994 (Rademacher 2011). The Japanese Grant Foundation and the World Bank jointly funded this report. The BBMS laid out a fourteen-point action plan to tackle the key issues including, a new sewerage

treatment scheme, improvements to solid and liquid waste management, and re-establishing the cultural and historical sites along the river (Rademacher 2011). However, this plan was never implemented.

One of the more successful responses to the worsening conditions of the Bagmati was the Bagmati Integrated Watershed Management Programme (BIWM), which was initiated by the Department of Soil Conservation and Watershed Management in 1986 (WOCAT 2009). This program was focused on improving the quality of the Bagmati Watershed through the empowerment of communities and individuals living within the watershed. Using participatory methods to planning, implementing, and monitoring, BIWMP was successful at fostering a partnership between community institutions, line agencies, and district authorities. This in turn helped build the capacity of local institutions by establishing communication facilities, building community networks, and empowering disadvantaged groups (WOCAT 2009). The bottom-up approach handed responsibility over to the communities, thus encouraging personal and sustainable stewardship of the Bagmati Watershed. Yet, this approach to water management has yet to be implemented in other locations along the Bagmati Corridor.

In response to the growing pressure from civil society, the Government of Nepal constituted the Committee for the Implementation and Monitoring of the Environmental Improvement of the Pashupathi Area on April 11, 1995. This committee was purely focused on improving the river quality within this small portion of the river. Later, on November 22, 1995 the committee's scope was subsequently expanded to cover the entire valley and name modified to

the High Powered Committee for the Implementation and Monitoring of the Bagmati Area Sewerage/Construction Rehabilitation Project (BASP). The committee constructed a sewage treatment plant upstream of Pashupatinath Temple, on the eastern bank of Bagmati given the religious significance the river has for Hindus. It only partially functions, while the other sewage treatment plants have been discarded.

The degradation of the Bagmati has fostered many concerned entities and prompted several awareness groups. The Save the Bagmati Campaign emerged in the 1990s as a force, bringing environmental issues to the forefront of the new multi-party democracy. Similar campaigns have continued to express their dissatisfaction and concern for the Bagmati. For instance, on August 11, 2001, the Nepal River Conservation Trust (NRCT) in collaboration with other concerned organizations started the Bagmati River Festival, which is an annual event that spreads public awareness about the conditions of the Bagmati and used as a platform for change (Dahal, Khanal, Ale 2011). The Bagmati River Festival has grown over significantly over the past 13 years, drawing larger crowds and partnering with over 100 organizations (Bagmati River Festival Brochure). The festival now lasts 2 and half months, with a variety of opportunities to increase local involvement. Similarly, Friends of the Bagmati (FOB) was launched by a group of concerned individuals. Their mission is to increase awareness and education on the Bagmati as a method to reverse degradation.

Similarly, a report produced jointly by the Nepal Water Conservation Foundation (NWCF) and NTNC (2009), recounts a meeting held between

different community stakeholders. The NWCF and NTNC surmised that two distinct perceptions were revealed. One perception follows a market-based approach: it sees nature as a source of rich opportunities. Opposite of this view is the view of egalitarians. They see nature as fragile and suggest that those who see nature as an opportunity must reconsider their view. The report states that managerial, hierarchical, and governmental sectors adopt an attitude in between these two extremes, which will be more effective at bringing change. The report fails to offer insight into the collaboration between these varying organizations.

Collaboration is Key

Previous studies and recommendations, programs, clean up campaigns and policies and acts have been initiated by various agencies, but in isolated forms. Rademacher (2011) reviews decades of river restoration projects on the Bagmati and the ways in which these actors have defined restoration. She found that environmental degradation did not lie with lack of knowledge about the issues, but instead stemmed from the failure of good governance. She further suggests different restoration frameworks of a variety of actors need to have a voice in Nepal's new political system.

Likewise, Dr. Ajaya Dixit and Dr. Diak Gyawali (2011) presented on the need for a holistic approach to the restoration and management of the Bagmati River Corridor. They argue that the city of Kathmandu needs to re-engineer the urban landscape and its infrastructure in order to become a healthy, livable city. Additionally, they urge advancing a multi institutional

approach to water management since it encourages a holistic approach.

The Rhine River[1] and the Cheonggyecheon River[2] restoration projects serve as invaluable case studies about how to restore and manage heavily polluted rivers. Similar to the Bagmati River, both rivers run through highly populated urban centers and were severely degraded. As the areas became increasingly urbanized and industrialized, the upkeep of the rivers fell to the wayside. Studies on these restoration projects (NWCF and NTNC 2009) focused on the massive coordination efforts between major stakeholders as well as the capacity and funds available to make these projects a success.

Research Objective

Many scholarly articles have assessed the water quality of the Bagmati River, how the river's poor water quality and management has led to the degradation of cultural heritage cites along its banks and the biological death of the river. Additionally, much of the literature addresses the growing need for restoration and improvement of water quality and the possible strategies to employ to reverse the degradation. Yet, there has been minimal research on the collaboration among actors on these projects and how the current

[111] The Rhine River begins in the Alps and flows through Switzerland, France, Germany, and the Netherlands and empties into the North Sea. The river has been used for trade and commerce for centuries, thus resulting in chemical and paper industries encroaching on its banks. Massive coordination efforts between the four countries in the 1960s and support from industries led to the rivers revival.

[2] The Cheonggyecheon River runs through the city of Seoul, South Korea. The river became so degraded that instead of restoring it, a highway was constructed over it as an economic development project. In 2003, the highway was removed and the river was restored.

institutional structures can be reordered to be more effective in their implementation of projects.

This research seeks to assess the projects and implementation strategies to reclaim the Bagmati River corridor within the Kathmandu Valley. After nearly thirty years of failed restoration projects and overall lack of improvement to the Bagmati River Corridor, my research asks: Who should hold the authoritative power over the rehabilitation of the Bagmati River Basin and how these institutions can be restructured to be more effective in their implementation. By investigating the ways in which these actors are collaborating on the restoration and reclamation of the Bagmati River and how these actors' definitions of development and goals for development projects align; I can assess the effectiveness on some of the projects in progress.

Methodology

In attempting to determine the level of cooperation between the Bagmati River actors and the feasibility of the rehabilitation projects, multiple methods were used to gather information, including structured and semi-structured interviews, intensive document reviews, and participant observation. Research was carried out within the Kathmandu Valley. I chose to focus only on the section of the Bagmati that flows through the Kathmandu Valley, since this is the most polluted portion and is the central focus of development projects.

Information was collected from the major stakeholders working on restoring that Bagmati River Corridor including, Nepal River Conservation Trust (NPRCT), Nepal Trust for Nature Conservation (NTNC), High Powered

Committee for Integrated Development of the Bagmati Civilization (HPCIDBC), River of Peace Campaign (RoPC), Green Team Nepal, IT Federation Nepal (ITFN), and Global Peace Foundation (GPF). This format was utilized in order to obtain clearer insight into the functioning of organizations, their contribution to the rehabilitation of the Bagmati, and their perceptions on the issues surrounding the implementation of projects. At the end of each interview I made inquiries about other vital organizations or actors involved in order to locate other organizations and actors for suitable interviews. I ran into obstacles when attempting to interview government officials, such as the Ministry of Urban Development and the Kathmandu Metropolitan City. Due to the time constraint and their lack of availability I was unable to meet with the central government and municipalities to fully capture the perceptions of the government.

The types of questions I engaged my interviewees in included asking how each organization defines restoration and conservation in order to see whether the actors' end goals align and what other organizations they have been working with on Bagmati development projects. As my interviews progressed, I began inquiring about the role of the HPCIDBC, their views of the current restoration projects, and how the process of restoration could be expedited. These questions helped assess the long-term feasibility of projects as well as guided my research into examining who should have authority over restoration projects. Furthermore, interviewing a range of environmental activists, government officials, and NGOs provided me with a wide array of opinions and possible solutions from a variety of actors. Moreover, this

method helped me avoid bias because it focused on the opinions of different institutions.

The semi-structured approach of these interviews allowed organizations to provide any additional information that they felt was important to include. The result of this method led to greater information on the implementation of restoration projects and current opinions on the work being conducted today. Furthermore, interviews provided a better understanding of the complexity of the Bagmati and encouraged me to ask the more challenging questions to answer.

In addition to my interviews, I did an extensive review of past restoration proposals and newspaper articles that detail over the time the plans for restoration of the Bagmati. Using the Martin Chautri library and an online database, I was able to chronologically order the efforts made by actors and assess the progress of the river and collaboration since the 1990s through newspaper articles. By reviewing and evaluating previous proposals that outline the trajectory for river cleanup, I gained a better understanding of the official narratives of river restoration and what these plans and research were lacking. Additionally, newspaper articles provided insight into how the civil society viewed the progress of projects.

Participant observation was used to render a clearer picture of the projects, functions, and uses of the Bagmati River including, locations the development projects, awareness and cleanup campaigns, religious and cultural sites, squatter settlements, parks, and wastewater treatment plants. I attended one of the Saturday morning cleanups that are taking place from

Jorpati to Gorkana. I also attended the New Year's Day festival, where the government officials along with other NGOs and activists bathed in the Bagmati. These events provided me an opportunity to speak first hand with participants about their perceptions of the cleanup and rehabilitation in an informal setting. Throughout the course of fieldwork, participant observation served as a valuable method because it allowed me to see firsthand the state of the river and action being taken to restore it.

Research Findings

Defining Restoration

According to Dr. Siddhartha Bajracharya, there are nearly one hundred individual organizations that exist for the purpose of restoring the dying Bagmati River. Some of these organizations have an environmentally focused agenda, while others concern themselves with the cultural and anthropocentric needs of the Bagmati civilization. Due to competing definitions of degradation and restoration, two different frameworks arise. The first is the scientific and technical framework, which addresses the needs of river restoration from an ecocentric and technical view. On the other hand, river restoration has been approached from an anthropocentric standpoint, by organizations such as Lumnati and UN Habit.

Firstly, the scientific and technical framework has been adopted by official agencies as a way to solve the river's decline. This official portrait of restoration is presented through various studies and documents prepared by the government and development agencies. These studies focus their energies on improving the biological quality of the river using a scientific prescription to

restoration. For instance, they outline the main causes for the river's degradation within the urban core. These include, (1) direct discharge of untreated liquid waste, (2) dumping of solid waste, (3) sand mining causing morphological changes, and lastly (4) human encroachment of river banks and flood plains. Human encroachment has been described as the root cause for the deterioration of the religious and cultural sites (Stanley Internation et al. 1994; NTNC 2009).

The official narrative is also closely tied to the development industry, where international development institutions and donors facilitate reports and studies on the river's decline. These restoration projects attempt to direct restoration in a way to create a vision for the cities, defined by the international community. Amidst the stabilization of the government in the early 2000s, a push for a more inclusive official narrative led to the Bagmati Action Plan (BAP), which attempts to accommodate all the varying definitions of restoration into one common vision.

The second narrative of river restoration is made up of the housing advocates. Within this framework, the primary concern is providing adequate shelter for those who have been marginalized with environmental stress as its dismal consequence. Housing and Sukumbasi[3] advocates do not deny that the river is degraded, but avoided using language that suggests that Sukumbasi settlements create adverse effects on the ecology of the river. These organizations tend to frame their visions for the riverscape in terms of a

[3] Sukumbasi refers to a person who cannot trace landownership within their family's past three generations. This term has become synonymous with the English word squatter.

sustainable urban future, meaning upgrading the public health, education, and sanitation conditions of the sukumbasi settlements to as opposed to moving them.

Since 2012, there has been greater collaboration between the government and the housing and sukumbasi advocates. The 10-day workshop, "Planning Inclusive City for the Urban Poor", began August 6, 2012 and ended August 15, 2012. This workshop brought together 100 people representing the poor settlements, media professionals, and representatives from INGOs and NGOS, national and international architects and focused on creating a plan to resettle the sukumbasi settlements along the Bagmati. Moreover, there are plans of further discussions with government officials about the implementation of the proposed plan (Lumanti 2012).

Dr. Siddhartha Bajracharya believes that the only way to bring about change is through the integration of these different frameworks. He argues that roles need to be clearly defined in order to avoid duplication and maintain forward momentum. Furthermore, it is imperative to create dialogues between these different agencies so that all aspects of degradation are included in the restoration efforts.

Steps Towards an Integrated Approach

The issues of the Bagmati are known, and the solutions have been exhausted, but why have rehabilitation efforts been unsuccessful? Major stakeholders have emphasized the need for an integrated approach to the management of the Bagmati River Basin time and time again. Ganesh Shah believes that by clearly defining the roles of organizations and increasing

collaboration among the isolated stakeholders, then the process of the restoration will be expedited and project duplication avoided. Over the past few years, there has been a greater push by the government to restore the Bagmati and its tributaries. This greater engagement and coordination has led to some visible progress being made on the riverscape.

In 2000, Pro Public, a non-profit organization, filed a lawsuit against government agencies in the Kathmandu Valley to prevent dumping of waste along the Bagmati River banks (Harmon 2011). Pro Public claimed that the dumping of waste violated the constitutional rights of citizens to a healthy environment. Additionally, it violated environmental laws that require government agencies to assess the environmental impacts of proposed waste disposal projects. The Supreme Court ordered local government agencies to halt dumping Kathmandu's waste along the Bagmati River and to study the environmental impacts of using a site for waste disposal before dumping is permitted (Harmon 2011). Besides moving the waste disposal site to Balkhu, and later to Sisdol, the government failed to fulfill the order (The Kathmandu Post 2010).

Later in 2004, Pro Public proceeded to file a case of Contempt of Court. The court ordered for the government to present a plan of action. This case marked a change in the government's participation in the restoration of the Bagmati and on August 20th, 2009, representatives from the Prime Minister's Office, the Ministries of Environment and Science, Local Development, Physical Planning and Works, and the Kathmandu Metropolitan City presented the Bagmati Action Plan to the judges. This plan showed a 5-

year commitment by the government to breathe life back into the Bagmati through restoration and conservation projects (The Kathmandu Post 2010). The political backing for the restoration of the Bagmati, forced by the courts decision, has helped improve the methods and approach to river restoration.

Previous proposed plans to restore the Bagmati River ecosystem did not recognize the complexity of this river scape. Instead, most plans were merely focused on improving the water quality, without taking into account the high cultural value or as Huta Ram Bayida would call it, the Bagmati Civilization. Dr. Siddhartha Bajracharya blames the purely technical approach by official plans and organizations for the prolonged failure of restoration.

The Bagmati Action Plan, developed by the NTNC and implemented by the HPCIBC was formulated with the intention to restore the Bagmati River and its tributaries through an integrated approach. The plan identifies key issues that need to be addressed including, decreased water discharge, decreased terrestrial biodiversity, narrowing and deepening of the water way, degradation of river water quality, decreased aquatic biodiversity, changes in riverside land use, decline in aesthetic value of river surroundings, and deteriorating culture and heritage. The NTNC then identifies its vision, goals, and projects for each key issue listed. Dr. Siddhartha Bajracharya described the plan as the "common vision" for the Bagmati, stating that as the NTNC composed this plan, they ensured many other voices were involved in the discussions about the activities that were to take place on the river.

The Bagmati Action Plan formulation process included, conducting meetings and discussions with governmental and non-governmental

organizations, CBOs, stakeholders, and experts; holding community consultations and interviews; and lastly, organizing workshops, seminars, and meetings to involve different groups that related to the Bagmati River (NTNC 2009).

The NWCF held a workshop on November 16, 2008, which brought together 40 select experts, students, activists, journalists, and community leaders to provide insight into how to solve the issues surrounding the Bagmati River's rehabilitation. From this session, the NWCF found that each actor had a distinct view on the river and its pollution. For instance, the Municipal representatives voiced that they seek guidance from the central government to implement plans. Additionally, they have expressed that On the other hand, water resource experts asserted that a variety of stakeholders with differing perspectives provide a multi-solution approach. Additionally, NGOs and community leaders are unhappy with the performance of the government and believe that through diverse proposals, each solution could be integrated into a common purpose. The NWCF used the outcome of this study and the perceptions of stakeholders to contribute substantially to the BAP in order to construct a common vision.

Along with the Bagamti Action Plan, the Chief Secretary Lina Mani Poudel initiated the Bagmati Clean-up Campaign, which plans to remove solid waste from a 21km stretch of the river and its banks from Bagdwar to Chobar (The Kathmandu Post 2014). This program has drawn over 1000 people from all walks of life including, representatives of the Nepali Army and Police Force, students, NGOs, and locals. In the 50th week of the campaign, over 350 organizations and hundreds of schools and universities have participated (The

Himalayan Times 2014). According to the campaigners, around 900 metric tons of waste has been removed from the river and its banks from Sundarijal to Minbhawan since the initiative began (The Himalayan Times 2014).

Ram Rohan Panta expressed that this campaign demonstrates the increase of coordination and efforts between stakeholders. Furthermore, it has brought greater public awareness and has drawn in greater government involvement. Although, Mausam Khanal indicated that collaboration really only exists when it comes to the public awareness campaigns and symbolic events, and that collaboration is still lacking in the actual formation and implementation of restoration activities laid out in the BAP.

Another example of greater corporation among stakeholders is the annual Bagmati River Festival, started by the NTNC in 2001. The Bagmati River Festivals initial aim was to provide a platform for like-minded organizations and individuals to come together to voice their concern and provide solutions. Today, over one hundred organizations such as, I/NGOs, research and development organizations, and civil society, have come to support the event. Beginning in 2008, along with the promotion of the BAP, the HPCIDBC adopted the Bagmati River Festival, but then in 2009 HPCIDBC no longer showed interest in the festivals organization (Dahal, Khanal, and Ale 2011).

These events show a growing initiative in improving the river systems within the valley. However, this method is only a short-term solution to a much more complex situation.

Defining Roles and Solutions

Unlike previous plans, the Bagmati Action Plan identifies the major stakeholders and clearly defines their role in the implementation of the plan. It requires the different governmental, non-governmental, and civil society to work on various components of the plan, in order to avoid conflict and duplication of work and optimize resources (NTNC 2009).

The BAP indicates that "caught amidst a plethora of organizations chasing too many priorities with too little resources, the Bagmati lacked ownership at every level." Thus, it suggests, "There is an opportunity to strengthen and legally empower the BCIDC to fill the present gap." The document requests that the HPCIDBC is strengthened in order to implement the plan. It states that the responsibility of the HPCIDBC is to act as the key organization with overall management authority. The HPCIDBCs role as key organizer includes, facilitating enforcement of the laws and regulations, building capacity at the local level for decentralization and participatory implementation, organizing research and monitoring activities, and bringing all the major stakeholders together.

The BAP has divided the valley into five different zones: Natural Conservation Core Zone, Rural Zone, Peri-urban Zone, Urban Zone and Downstream Zone, in order to tackle the issues of river pollution at the micro level. This includes each stakeholder working within the different zones and on different aspects of restoration. The plan proposes afforestation and rainwater harvesting in the Shivapuri Watershed and other areas to increase water quality and flow of the river. Priority has been designated to onsite

sanitation including technologies such as ECOSAN toilet to improve environmental sanitation and reduce river pollution at Natural Conservation Core Zone and Urban Zone.

In addition, the plan also proposes rehabilitation of the existing wastewater treatment plants and the promotion of Decentralized Wastewater Treatment System (DEWATS). Also, the BAP calls for a public private partnership approach for the fecal sludge management in some areas as well. The plan also recommends establishing short and long-term sanitation landfill sites for waste management. Lastly, it promotes household and community level waste management system, and engage private sector for the management of solid waste in Kathmandu Valley.

Within the document, the major stakeholders are divided into different aspects of river restoration, each having a responsibility in implementing one of the solutions in their designated zone. It identifies nine partner agencies and defines their roles for implementation of the action plan and in working for the improvement of rivers in the Kathmandu Valley. These nine agencies include: user committees and community-based institutions, municipalities and Village Development Committees (VDCs), District Development Committees (DDCs), NGOs and the private sector, Shivapuri National Park (ShNP), Kathmandu Valley Water Supply Management Board, Department of Water Supply and Sewage (DWSS), UN Park Development Committee, Kathmandu Upatyaka Khanepain Limited (KUKL), and the NTNC. Additionally, government line agencies have been identified as playing a large part in the protection of the river ecosystem.

Through this integrated approach to river management, the Bagmati Action Plan attempts to bring the different stakeholders vision into one document, and then clearly defines the roles of governmental and non-governmental organizations in order to prevent duplication and promote collaboration. However, without adequate implementation and guidance by the HPCIDBC, coordination will be difficult to achieve.

Faltering Cooperation

The Bagmati Action Plan served as a promising plan that uses an integrated approach to restoration. The Bagmati Action Plan took into account the different actors involved in projects and public awareness campaigns, specifically naming 30+ organizations that play significant roles in the river's restoration. Yet, cooperation is still lacking and restoration projects are slowly moving forward.

The initial Bagmati Action Plan presented by the NTNC to the government proposed a similar concept to the Annapurna Conservation Area Project (ACA) that is managed by the NTNC. This model uses an integrated and community based conservation and development approach, which has been extremely successful within the ACA. Using the ACA project model, the NTNC proposed a systematic intervention in the Bagmati that would cover a 30 km stretch along the Bagmati River and bring back life to the river system. They proposed to have a more formal and legal designation for the river as per the Environment Act of Nepal. Lastly, NTNC proposed to personally manage and implement the BAP. The Nepali government rejected this proposal, since they wanted to maintain control over the activities conducted along the

Bagmati River Corridor. Additionally, if the NTNC managed the Bagmati, then the HPCIDBC would have no role or purpose.

Instead, the government adopted the Bagmati Action Plan and had the plan call for a special legislative act to consolidate the existing arrangements into one body for greater efficiency in the implementation of projects. The BAP advises that HPCIDBC's currently drafted Bagmati Civilization Integrated Development Council Act is supposed to fulfill that role and fill the present gaps in the preexisting arrangements. Unfortunately, many expressed disappointment with the HPCIDBC's management, voicing that coordination is still lacking, and it is the responsibility of the HPCIDBC to preform (Dr. Siddhartha Bajracharya 2014).

According to Mr. Bharat KC, the HPCIDBC meets weekly with the major stakeholders; this includes Kathmandu Metropolitan City (KMC), Lailitpur Metropolitan City (LMC), Ministry of Urban Development (MoUD), and civil society. Regardless, only working with the municipalities is not enough, since they do not represent all who are working for the purpose of restoring the Bagmati.

The attitude of the HPCIDBC did not seem to encourage collaboration. Staff of the HPCDIBC made sure to emphasize that that is was not the role of the HPCIDBC to manage solid waste, but of the KMC. Additionally, they highlighted that they did not coordinate with other organizations regarding construction activities. Furthermore, Dr. Siddhartha Bajracharya emphasized that the HPCIDBC has never asked for any kind of support from the NTNC, even though the NTNC composed the plan. And Mr. Bharat KC said that they plan to work with the IUCN to update the BAP.

Many issues stem from the internal structure of the HPCIDBC. The Bagmati Civilization Development Council Act required the council to be made up of secretaries from various concerned ministries, heads of the municipal bodies within the Valley, water utility KUKL, Pashupati Area Development Trust, NTNC, and five more experts identified by the government, including a woman. Regrettably, the HPCIDBC staff is primarily made up of civil engineers or professionals with technical backgrounds (Bharat Bahadur KC 2014). Dr. Siddhartha Bajracharya believes that without staff with backgrounds in a variety of disciplines, a holistic approach to river restoration will never be achieved. Additionally, the staff is not large enough to tackle all the key issues presented in the BAP.

As demonstrated by past restoration projects, without collaboration the Bagmati cannot be restored. Dr. Siddhartha Bajracharya insisted, "Organizations just do not have the full capacity and resources to function as isolated groups," thus they must come together to encourage improvement.

Mismanagement of the Bagmati

Many of the organizations I spoke with stressed the need for a strong authoritative voice to implement and uphold policies and legislation, as well as bring together the opposing actors. The HPCIDBC, according to the Bagmati Action Plan was to fill the gaps that have existed in previous restoration efforts. Unfortunately, the HPCIDBC is failing to fill the gaps and still lacks an authoritative voice and effective management that is strong enough to dig the river out of its dire state.

The Bagamti Action Plan called for the formation of the HPCIBC through a legislative act. This in turn gave the legal authority over the HPCIDBC to report any illegal activities 50m to the left and right from the center of the Bagmati (The Kathmandu Post 2010). Yet, Mr. Bharat KC expressed that any incident still has to be reported to the Ministry of Environment, Science, and Technology, therefore the HPCIDBC still lacks considerable power when it comes to legal action against violators of the Environmental Protection Act.

Mausam Khanal points to unclear policies and guidelines as a major problem from the implementation of projects. He voiced, that without clear guidelines for outside organizations to move forward on projects, the process of restoration will continue to be prolonged. He cites the UN Park project as an example, stating that there have been many disputes over its construction, since it is unclear as to who has jurisdiction over the project.

Mr. Bharat K.C. expressed that the HPCIDBC still lacks capacity and funding. For example, the implementation for the 5-year plan, approximately Rs. 15,028 million is needed, where the most money is allocated to fixing the urban core (NTNC 2009). Unfortunately, the central government has not provided that necessary funding that they promised to provide during the drafting phase, thus the HPCIDBC is reaching out to outside donors such as the Asian Development Bank (ADB) to fund the projects. Without adequate funding, projects are drawn-out, since money is not available for staffing and implementation.

Similarly, questions have arisen about why the government is unable to fund sanitation projects. Citizens of Kathmandu are required to pay a monthly

water utility bill, which supposedly goes towards water sanitation. Since there is no working water sanitation system, it is unclear where the money is actually being distributed. This may indicate a corrupt governmental system.

Many NGOs and the Nepal Government have taken to symbolic acts within recent years in order to show that the river is in fact cleaner in parts than it use to be. On the Nepali New Year 2071, Chief Secretary Paudel, Secretary at the Prime Minister's Office Krishna Hari Baskota, Joint Secretary at the MoUD Abadh Kishore Mishra and Bagmati cleanup campaigner Dr. Raju Adhikari bathed in the river along with around 100 people (Figure 6). Dr. Siddhartha Bajracharya describes the premature celebrating as "bureaucratic propaganda". He explains, that symbolic action such as this event and the cleanup campaign are not sustainable solutions to the conservation of the Bagmati, they are just for show. Moreover, he asserts that these symbolic acts cover up the actual conditions of the river, thus undermining the immediate need for actual restoration projects.

Although, in Dr. Siddhartha Bajracharya's opinion, a government agency or organization entrusted by the government should still have authority over the restoration and conservation of the Bagmati. He resolves that power should be in the hands of the National Government because of the number of stakeholders involved. On the other hand, Ganesh Shah, an environmental activist, passionately expressed that the authority should not come from the state, but should come from the local municipalities and larger institutions. Ganesh Shah argues that more effective management could come from the municipalities. They could have the authority to tax residents and industry for their pollution, while providing incentives to those who invest in sustainable

technologies. By handing power over to the local government, they are forced to take responsibility for the river, therefore more inclined to manage it properly.

Since restoration and conservation has yet to be achieved, questions regarding who should have authority over the river continue to plague the minds of the actors working on the Bagmati. But is one authority the correct method to solving the problem of implementation?

Discussion and Analysis

As opposed to past plans and proposals, the government has become fully immersed in the campaigns, restoration projects, and construction occurring in the river corridor. Through their increased participation and willingness to fund, there have been visible changes to the riverscape. Less garbage sits in the river thanks to the progress of the Mega Clean-up Campaign, and the promise of a sewerage line by 2017 leaves many people hopeful that the holy river will run clean again. Yet, institutional failure and messy municipal systems have resulted in big visions with little capacity, funding, and a limited scope of work.

The original BAP states, "an institution with strong legislative power to control and regulate activities in the rivers of Kathmandu Valley must own and implement this plan." As the past four years have shown or not shown, a single institution might not be the solution to the implementation of the plan. From the actors I spoke with, Binod Basnet expressed that, "only one authority might not work… we need to sit together and take responsibility". This

sentiment and recognition that the current model is ineffective shows that there is a want for change, but what is stopping change from occurring?

Throughout the course of my research I found that due to Nepal's political instability, much of the restoration process has been prolonged. Also, coordination among stakeholders is still lacking and the HPCIDBC is not functioning as outlined in the BAP. Therefore, the central government should not hold the power over the Bagmati River restoration projects, but instead greater power should be handed down to the local government within the Kathmandu Valley. Additionally, major reforms to institutional structures needs to occur in order to include a greater variety of voices involved in decision making. Moreover, a multi-institutional approach (private and public) to restoration has the potential to be a more effective method due to the instability of Nepal's central government.

While collaboration does exist among some of the governmental and non-governmental organizations working for the purpose of the restoration and conservation of the holy Bagmati, this only holds true for the public awareness campaigns that are only fixing the effect of pollution, not the cause. Cooperation efforts still need to be improved, and many organizations point to the HPCIDBC as the organization to be the leader and coordinator.

As of now, the HPCIDBC does not have the capacity or the proper management to quickly restore the Bagmati and unite the actors. The HPCIDBC may be a more effective body if the staff were composed of professionals from varying backgrounds in order to enforce a holistic approach to restoration. When speaking with the HPCIDBC, I found that there was arrogance in regards to other government agencies and their effectiveness.

They tended to point fingers at other organizations and blamed them for the failure of restoration, without acknowledging their own culpability. Furthermore, there appears to be some level of corruption within the central government. This is demonstrated by the fact that money from the water utility bills is not going towards the water. People are forced to pay their water utility bills and reap no benefits. If the money is not being handed down to the HPCIDBC to support wastewater treatment centers, then where is the money going and what is the money being used for?

From other river restoration projects around the world, success has come from the implementation of small programs from the local level with cooperation and support from governments, NGOs, businesses, and environmentalists (NWCF and NTNC 2009). In order to see improvement to the Bagmati, restructuring and empowerment of current institutions is necessary along with a greater willingness to collaborate, but this is easier said than done.

There has been little attempt to control the loss or deal with the mess in the municipal system because the institutions that were created are essentially construction-oriented outfits designed to disburse foreign aid and are not equipped for water management or distribution. Larger institutional changes need to occur in order for implementation to succeed. Possible ways to restructure institutions include, decentralizing power, empowering municipalities and other institutions, and creating a representative and diverse body to provide different perspectives on restoration.

Instead of power over river restoration being held by the central government, power should be decentralized and dispersed among the 5

municipalities in the Kathmandu Valley. A group could be formed from a representative from each municipality to increase coordination between them and deconstruct boundaries between these administrators. Using the BAP as their guide, it would be the role of this group to implement the number of activities and solutions and coordinate with the different actors. By empowering municipalities, they gain accountability over this finite resource, thus becoming more invested in improving the river's condition.

Similarly, a community participatory approach to river monitoring and management has the potential to halt degradation. Community empowerment and development programs have proven to be environmentally beneficial in Nepal. For example, the Community Forest User Groups have empowered communities to have full authority and responsibility over the management of forests, in turn increasing community awareness about the importance of proper management. The same notion can be applied to rivers. For instance, the program, Kathmandu Participatory River Monitoring is using a community participatory approach to water monitoring. Through the empowerment of communities through education and increased responsibility, greater initiative will be taken to manage the Bagmati.

Many small water improvement initiatives have proven successful on a smaller scale in Nepal, but have not been duplicated to the level of the Bagmati. Private companies such as Smart Paani and NGOs like Environmental and Public Health Organization (ENPHO) are working on improving water management in Nepal. Smart Paani works with households, institutions, and schools to introduce rainwater harvesting, water filtration, and water recycling. Comparably, ENPHO has worked with communities to

implement constructed wetlands as a simple, locally manageable, and cost effective way of managing pollutants. With government support, these small-scale initiatives could prove as long-term sustainable solutions to the water crisis on the Bagmati.

Ganesh Shah argued that the four H's, hospitals, higher education, hotels, and housing colonies should be the leaders in reformation of waste management practices. Bir Hospital is one example of an institution that has taken the initiative to implement a zero waste program so that the waste disposed into Kathmandu's municipal waste stream is negligible. Similarly, the Coca Cola Foundation has sponsored the "PET Recollection System Nepal", which aims to responsibly collect and dispose of used PET bottles. These personal initiatives to responsibly manage waste could lead to greater success in the restoration of the Bagmati.

Lessons can be drawn from other successful restoration projects around the globe, such as the Rhine River in Europe or the Cheonggyecheon in South Korea. The solution for restoring the Bagmati to its once pristine self lies in incorporating various disciplines. Other voices, besides government officials needed to be heard and incorporated into the implementation of projects. Additionally, institutions and industries need to take initiative to reduce their impact by investing in safer technologies. Overall, municipalities, private companies, and communities may have better success at restoring the Bagmati.

Conclusion

Early morning on the Nepali New Year, I observed the Chief Secretary Paudel, Secretary at the Prime Minister's Office Krishna Hari Baskota, Joint Secretary at the Ministry of Urban Development Abadh Kishore Mishra and Bagmati cleanup campaigner Dr Raju Adhikari along with 100 others take a dip in the holy Bagmati River along side the Gueshwori temple. The river was the cleanest I had seen it. There was no garbage standing in the shallow water and no horrible stench. Yet, a few days later I returned to the area and observed a different circumstance. The water was stagnant, with even shallower pools and garbage floating on the surface. This symbolic event to celebrate the cleanliness of the river was just that, symbolic.

One can not deny that the current state of the river has come a long way since the Mega Clean-up campaign began, but it still has much further to go. This action is a step, but it really only addresses the effects rather than the causes of pollution. Larger institutional changes need to occur in order for long-term sustainability of projects to be successful.

The restoration and conservation of the Bagmati River Corridor is by no means an easy task. The complexity of the issue is seen throughout the reports, studies, and literature on the river. My research only captures one component of the complicated issue. Further research could lead to clearer and more developed solutions to the complexity of river restoration. These questions include, how can institutions be restructured to be more effective at the implementation of the BAP? Which institutions and organizations can best

provide the services needed to implement the solutions? How could the central government be a stronger body to guide coordination?

The Bagmati still remains the source of Kathmandu's civilization and the heart of Kathmandu's culture, but as it continues to decay, with it the traditions of the Valley. With the increased passion and enthusiasm that has appeared in recent months, people have become more hopeful that in the not-too-distant future the once pristine river will be restored. Soon, once again children and fish will swim together, pilgrims will take holy bathes without hesitation, and the citizens of Kathmandu will love and respect their holy Bagmati.

Acronyms

ACA	Annapurna Conservation Area
ADB	Asian Development Bank
BAP	Bagmati Action Plan
BOD	Biological Oxygen Demand
DEWATS	Decentralized Wastewater Treatment System
ENPHO	Environmental and Public Health Organization
HPCIDBC	High Powered Committee for Integrated Development of the Bagmati Civilization
DO	Dissolved Oxygen
KMC	Kathmandu Metropolitan City
KUKL	Kathmandu Upatyaka Khanepain Limited
MoUD	Ministry of Urban Development
NGO	Non- Governmental Organization
NRCT	Nepal River Conservation Trust
NTNC	National Trust for Nature Conservation
NWCF	Nepal Water Conservation Foundation
WEPCO	Women's Environmental Preservation Committee

Appendix

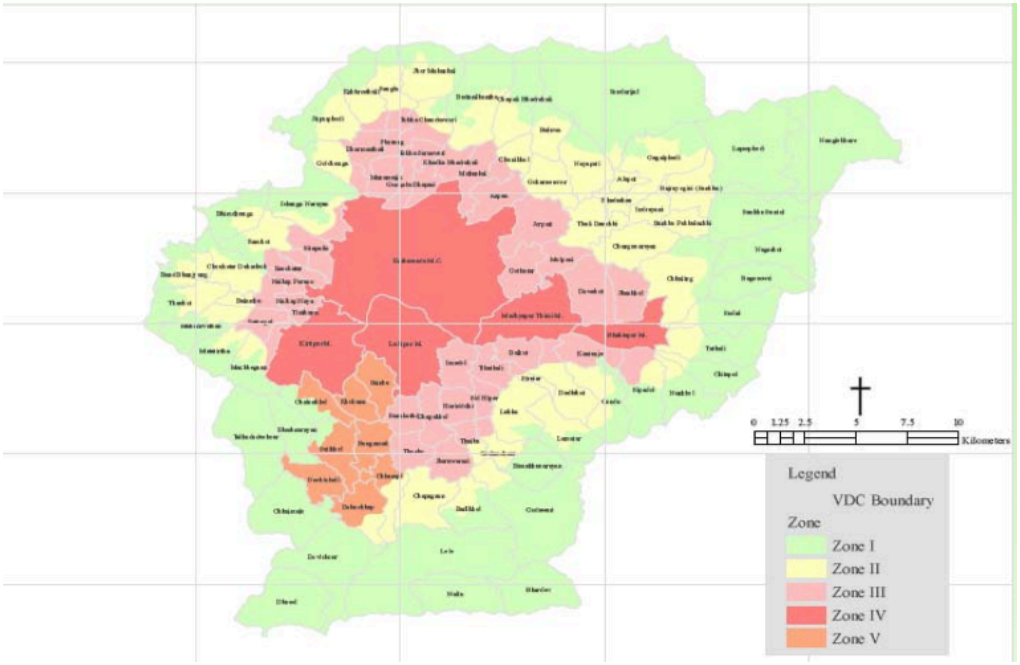

Figure 1: Zonation of the Kathmandu Valley (2008). National Trust for Nature Conservation (NTNC). 2008. *Bagmati Action Plan (2009-2014): Draft Report*.

Figure 2: Pashupatinath Temple (2014). Photo taken by author.

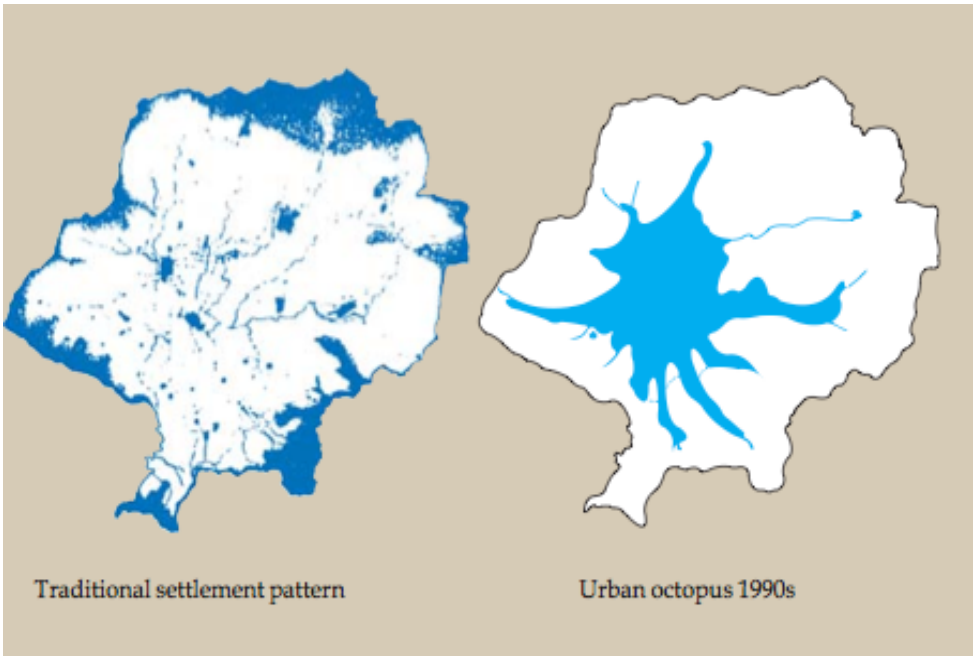

Figure 3: Urbanizing Kathmandu (2009). National Water Conservation Foundation (NWCF) and National Trust for Nature Conservation (NTNC). 2009. *The Bagmati: Issues Challenges and Prospects, Kathmandu*.

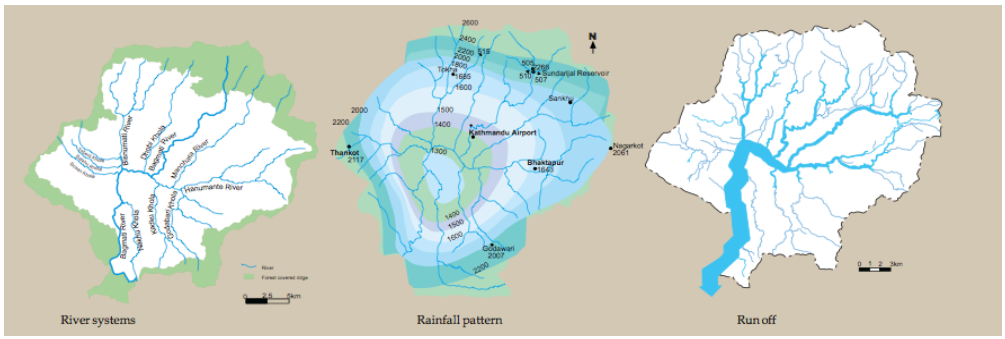

Figure 4: Hydrology of the Upper Bagmati Basin (2009). National Water Conservation Foundation (NWCF) and National Trust for Nature Conservation (NTNC). 2009. *The Bagmati: Issues Challenges and Prospects, Kathmandu*.

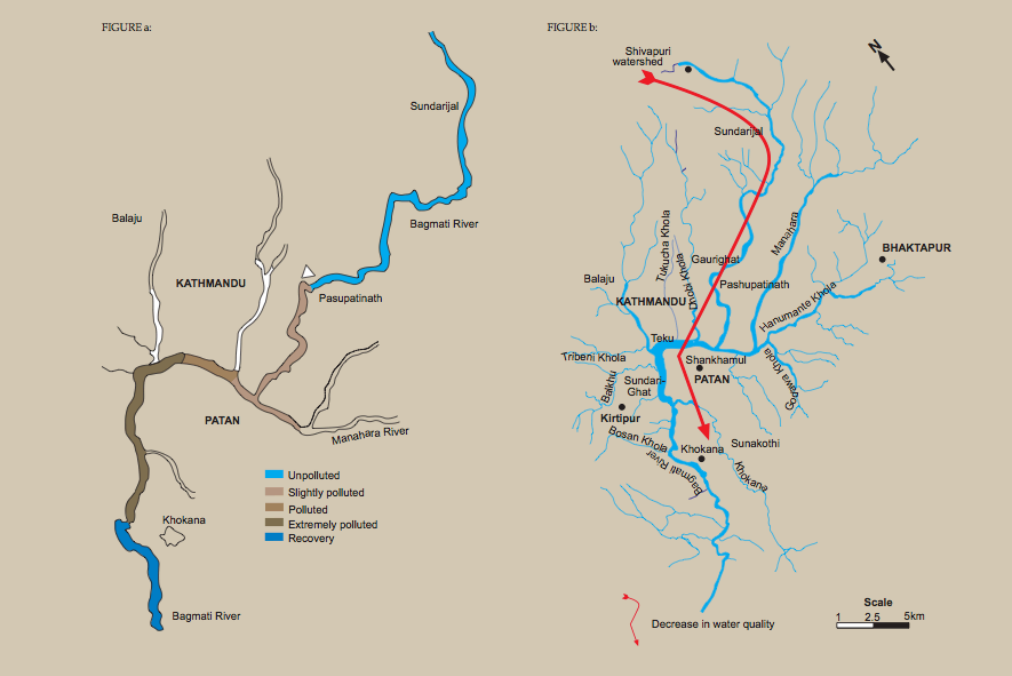

Figure 5: Changing Water Quality (2009). National Water Conservation Foundation (NWCF) and National Trust for Nature Conservation (NTNC). 2009. *The Bagmati: Issues Challenges and Prospects, Kathmandu*.

Figure 6: Holy dip in the Bagmati (2014). Photo taken by Author.

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