

# SUSTAINABILITY ASSESSMENT OF FUND BOARD WATER AND SANITATION PROJECTS IN NEPAL



**Master Thesis**

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**Sustainability Assessment of Fund Board  
Water and Sanitation Projects in Nepal**

Three Case Studies in Rural Communities in  
Central and Western Nepal

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*“If we come to a single platform as a group, we can achieve anything. But if we forget to act as a group, everything remains as it is.”<sup>1</sup>*

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<sup>1</sup> Narayan Shrestha, chairman of WSUC in Madhavpur, Pithuwa VDC explaining how the situation in respect to water could be improved in the community.

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## Executive Summary

Access to drinking water and basic sanitation are closely linked to human health and well-being. It is estimated that 580 million people do not have access to sanitation in South Asia. (UN MDG, 2009). Also in Nepal, one of the poorest countries in the world, most people lack access to drinking water and especially sanitation. Access to safe drinking water and basic sanitation is inalienable for well-being and the human right to health. Access to these basic services is vital for development, poverty reduction and has positive effects on people's health and hygiene.

In Nepal, there is a remarkable gap between access to drinking water and sanitation. UN MDG (2007) estimates that in 2005, 79% of the population in rural and 93% in urban areas have access to water. However regarding sanitation coverage, only 30% of people in rural and 81% of people in urban areas have access to toilets. Although drinking water coverage is relatively high, especially in urban areas, the quality of water is often insufficient for drinking. Besides the low quality of water in urban areas, a large majority in rural areas lacks access to toilets. Therefore, open defecation is widespread. This practice has severe consequences for the individual's health but also puts the household and the community at risk of being affected by water-borne diseases. Diarrhea is widespread especially in rural areas. Because access to health posts is lacking in many rural areas in Nepal, more than 30,000 adults and an additional 45,000 children under the age of five die annually due to diarrhea (Ansari et al., 2009: 235).

In order to meet the MDG goal 7 target 10, to halve by 2015 the proportion of people without sustainable access to safe drinking water and basic sanitation, the government of Nepal has set ambitious targets: to provide 90% of the population with safe drinking water and basic sanitation by 2012 and to achieve full coverage of these services by 2017 (UN Habitat, 2009: 14).

Although intentions to improve access are there, the government of Nepal lacks the capacity and funds to provide access to water and sanitation (WatSan) especially in rural areas. As a result, numerous INGOs, NGOs and the private sector are working to improve access to these services in urban and rural areas. One of the main organizations focused on rural areas is the World Bank funded Rural Water Supply and Sanitation Fund Development Board (Fund Board) created in 1996.

The Fund Board works directly with communities and has implemented more than 1300 projects, benefitting 1.4 million people in rural areas. The Fund Board provides funds and training to local and regional NGOs, so-called Support Organizations (SO), which are implementing Fund Board projects within a 2-year cycle. To increase ownership and sustainability in the targeted communities, a Water and Sanitation Users Committee (WSUC) is formed and works jointly with the SO during the entire project phases. The WSUC is also mainly responsible for maintenance and operation of schemes after its implementation (Fund Board, 2009). Although the lifetime of water supply systems is designed for 15-20 years, some communities face huge difficulties in maintaining the water schemes after the SO has left. In fact, 20% of Fund Board schemes are defunct and need major repair after 5 years (WaterAid Nepal, 2009: 25). Unfortunately, such statistics are not uncommon within the WatSan sector; only 21% out of 5000 water points in 22 hill districts are functioning as designed, 56% need major repair and 21% require complete rehabilitation (Bhattarai & Adhikari, 2009).

As the Fund Board is a key organization in rural water supply and sanitation sector, it is important to understand what aspects can enhance or diminish the sustainability of these projects. Three communities were visited in order to understand the impact of the Fund

Board projects. Sital Tole and Madhavpur second in the Chitwan District and Chintutar in the Tanahun District were included during this study. In order to get a variety of opinions about the Fund Board projects, various stakeholders were interviewed during the research in Nepal. Besides the WSUC and other community members, the head of the local schools and teachers were also included during field-visit. Additionally, the local and regional secretaries of VDC, DDC and the implementing SOs were also interviewed during research. Finally representatives from the Fund Board and the World Bank were also interviewed several times.

Several aspects were found to influence sustainability of Fund Board water and sanitation projects in rural communities.

First of all, the way a project is implemented influences to a large extent how the facilities are maintained afterwards. Thus, community participation, project set up, gender and minority sensitivity, health and hygiene training and the financial contribution of the community influence the project's sustainability. In order to increase sustainability, many donors favor community driven projects to provide water and sanitation. Assuming that, when community members are involved in planning, implementation and maintenance of the water supply system, the infrastructure can be sustained more easily (World Bank, 2010, Doe & Khan, 2004 Mansuri & Rao 2004). Even after project completion, environmental aspects, the technical design and financial maintenance also influence strongly whether the system lasts for the designed lifetime.

Overall, there are numerous positive findings about the Fund Board projects: especially community mobilization, the focus on social development, the improved health and hygiene situation and also the high level of community participation. The WSUC was highly involved during all phases of the project and community members participated at various stages, for example attending and participating during meetings, carrying out the baseline survey with the SOs, discussing and drafting the Community Action Plans during the development phase, and their labor contribution during the construction of the water supply system. The Fund Board approach seems inclusive and gender sensitive. At least three women are part of the WSUC members. Moreover, women can participate in the women's technical support service (WTSS), and are linked with microfinance institutes to make use of the time gained to invest in income generating activities. Also thanks to the Fund Board, communities establish regular contact to local NGOs and capacity of the WSUC members is built to manage and maintain the water supply system.

Yet, at the same time various aspects need to be reviewed. Mainly, financial capacity to maintain the system needs to be reconsidered: there are not sufficient funds for a major repair of the water supply system at the local level, and therefore more coordination with local and regional government is needed. Also increased awareness training is necessary to improve sanitation condition in the communities; this could be enhanced by stronger involvement of the local schools. Students and the female Village Health Promoter could emphasize behavior change in the community and ensure that all household members are using their toilets. Moreover, not all sources are covered, so water quality might be contaminated by human activities or animal waste.

In the end, the Fund Board approach seems to meet most of the criteria to achieve sustainable outcomes. However, the implementation of projects is not fully keeping up with the goals set by the Fund Board. Besides, mainly financial maintenance of the water supply system needs to be reconsidered.

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## Acronyms and Abbreviations

ADB	Asian Development Bank
CLTS	Community Led Total Sanitation
DoLIDAR	Department of Local Infrastructure Development and Agricultural Roads
DDC	District Development Committee
DWSS	Department of Water Supply and Sewerage
ENPHO	Environment and Public Health Organization
Fund Board	Rural Water Supply and Sanitation Fund Development Board
LDO	Local Development Officer
MDG	Millennium Development Goals
MLD	Ministry of Local Development
MPPW	Ministry of Physical Planning and Works
NEWAH	Nepal Water for Health
NRCS	Nepal Red Cross Society
O+M	Operation and Maintenance
ODF	Open Defecation Free
PRSP	Poverty Reduction Strategy Paper
SDRC	Social Development and Research Center
SLTS	School Led Total Sanitation
VDC	Village Development Committee
VHP	Village Health Promoter
VMW	Village Maintenance Worker
WASH	Water, Sanitation and Health
WatSan	Water and Sanitation
WSUC	Water and Sanitation User Committee

# 1. Introduction

Nepal is a landlocked country bordering Tibet in the North and surrounded by India in the West, East and South. The South Asian state is among the poorest countries in the world, with Human Development Index at 0.553 leaving Nepal on rank 144 out of 182 in 2007 (UNDP, 2009). With about 24.7% of the population living below the poverty line and 40% of unemployment, poverty is widespread in Nepal. GDP per capita is only at USD 470 (World Bank, 2010). Most of the population (80%) still lives in the countryside and works in agriculture, which generates about a third to the national GDP. Although Nepal has seen an increase in urban migration (4.9% increase annually) in the last decade, the country is still considered agrarian (CIA, 2010).

Most poor people live in rural areas and work in subsistence agriculture on small plots of low quality land, have limited access to infrastructure, markets and basic social services. This lack of services is also expressed in the literacy rate; only 62% of men and 34% of women can read and write (Nepal Census, 2001). Especially ethnic minorities, women and lower caste communities in remote areas lag behind in terms of incomes, assets and most other human development indicators in Nepal (World Bank, 2010).

Besides lack of access to roads, electricity and health posts, many people do not even have access to potable water and sanitation. In Nepal, there is a remarkable gap between access to water and sanitation (WatSan). UN MDG (2007) estimates that 79% of the population in rural and 93% in urban areas have access to water but only 20% in rural areas and 30% of in urban areas have access to sanitation facilities in 2005. The World Bank (2010) estimates sanitation coverage at 27% of the population for sanitation and 89% for drinking water in 2008<sup>2</sup>.

Although drinking water coverage is much higher than sanitation, it is not necessarily safe water people have access to in urban and rural areas. Additionally, those water supply facilities in place are often in poor condition and/or already broke down. In fact, only 21% out of 5000 water points in 22 hill districts are functioning as designed, 56% need major repair and 21% require complete rehabilitation (Bhattarai & Adhikari, 2009).

Moreover, the state of sanitation is more startling than access to water in Nepal. While a large majority lacks access to toilets, open defecation is widespread in rural but also urban areas. This practice has severe consequences for the individual's health but also puts the household and the community at risk of being affected by water-borne diseases such as diarrhea, typhoid, skin diseases, and intestinal worms. In fact, 30,000 people die annually because of diarrhea. Diarrhea among children is also widespread and a major cause of the relatively high child mortality rate around 47 deaths per 1000 live births in Nepal<sup>3</sup>. As a consequence of diarrhea about 45,000 children under age of five years die (Ansari et al., 2009: 235).

Especially in the rural context, access to WatSan is crucial for development and poverty reduction. Access to WatSan improves daily life of people and ensures a healthier workforce, reduces child mortality, decreases time to fetch water and improves environmental sustainability. As it will be described in the next chapter, access to WatSan is inalienable for human health and is an essential part of human rights.

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2 Data about water and sanitation coverage is inconsistent and varies greatly between the government, INGOs and NGOs.

3 The CIA defines child mortality rate as the number of deaths of infants under the age of one in a given year per 1,000 live births in the same year.

In order to achieve the MDGs by 2015<sup>4</sup>, ambitious goals are set by the government. The National Water Plan aims at providing basic drinking water services and basic sanitation facilities to 90% of the population by the end of 2012 (UN Habitat, 2009: 14) and full national coverage by 2017. Yet there are numerous obstacles hampering the extension of services to all Nepalese people.

Because the government of Nepal lacks the capacity and funds to extend services to its citizens, numerous INGOs and NGOs are implementing projects to improve access to water and sanitation all over Nepal. One of the main organization focused on rural areas is the World Bank funded program Rural Water Supply and Sanitation Fund Development Board (Fund Board). The Fund Board marked a shift from the conventional supply-oriented approach towards a more demand-driven and participatory approach. Since its establishment in 1996, more than 1300 projects in all districts were implemented, benefitting more than 1.4 Million people in communities with less than 1000 inhabitants. As the Fund Board is a key organization in rural water supply and sanitation, three selected projects are surveyed during this study. The aim of this study is to understand what aspects can enhance or diminish the sustainability of these projects. The main research question of this study is as follows:

***What aspects influence the sustainability of Fund Board water and sanitation projects in rural communities in Western and Central Nepal?***

Looking at two villages in the Terai and one in the hilly areas, my research is investigating which aspects lead to the most sustainable outcomes. Therefore it takes a closer look at the financial, social, health and hygiene, institutional, technical and environmental aspects influencing the respective projects sustainability.

The thesis is organized as follows: chapter 2 describes the thematic context of water supply and sanitation with special emphasis on the agenda of international development cooperation. The theoretical debate is summarized in the second part of this chapter; thereby looking at shifting paradigms from centrally planned top-down projects to more bottom-up and participatory approaches. Chapter 2 ends with a special emphasis on the rural context and outlines why participation during project design and implementation is important to enhance sustainability. Chapter 3 presents the research methodology and defines the concept of sustainability relevant for this thesis. This chapter also describes what the limitations of research conditions and research concepts are. Chapter 4 briefly overviews Nepal's history, society and the current economic trends influencing Nepal's development today, describes the state of water and sanitation in Nepal and introduces the Fund Board organization. This chapter also outlines the regional and local context of the three selected communities in order to understand the findings. The findings from various interviews and household surveys are presented in chapter 5. Chapter 6 concludes the main findings from the previous chapter, and links the findings to the academic debate. After that, various external factors influencing the extension of water and sanitation are mentioned. Chapter 6 finally describes future scenarios of the Fund Board projects and provides recommendations for improvement. Chapter 7 finally concludes with a brief summary of the thesis and elaborates on opportunities and challenges in water and sanitation, followed by a SWOT analysis before the chapter ends with final remarks for future research.

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<sup>4</sup> MDG Goal 7: to ensure environmental sustainability and especially target 10: to halve the proportion of people without sustainable access to safe drinking water and basic sanitation' (UN, September 2001)

## 2. Thematic Context and Theoretical Framework

The main focus of this chapter is twofold: The first part gives an overview of water and sanitation issues as part of international development cooperation. The second part discusses the major paradigms in relation to water and sanitation and addresses conventional approaches used in the sector, with special emphasis on the rural context. Finally the theoretical debate about community-driven projects and sustainability is presented in the second part of this chapter.

### 2.1. Thematic context of water and sanitation

The United Nations estimate that more than a third of today's global population (2.3 billion), do not have access to water and sanitation (2006). Although South Asia and Sub-Saharan Africa had the lowest sanitation coverage in 1990, there has been remarkable progress in improving sanitation coverage. Since 1990, the amount of people using improved sanitation facilities in South Asia has doubled and has also increased in Sub-Saharan Africa to 80% in 2006 (UN MDG, 2009). Still, attempts to achieve the MDGs are challenged, especially with regard to large differences between rural and urban areas. In South Asia it is estimated that 705 million people still practice open defecation in rural areas compared to 74 million who do so in urban areas. Open defecation has severe consequences for the health of an entire settlement. Additionally, for girls and women to find places for defecating in the open can put their safety at risk. As a consequence, many women avoid going to defecate or urinate altogether by drinking very little during the day, putting their health and well-being even more at risk. Therefore improving sanitation coverage together with establishing access to safe drinking water is of crucial importance for development and ensures to achieve the MDG goal 7 (ensure environmental sustainability), goal 4 (reduce child mortality) and goal 5 (improve maternal health) as well.

Despite remarkable progress in improving sanitation coverage over the last years, the issue has a lower priority in policy frameworks compared to the provision of drinking water (UN MDG, 2009). So while coverage has increased overall, quality of facilities vary (MDG Monitor, 2005). In South Asia, lack of drinking water is mostly a rural phenomenon and strongly linked to poverty. Moreover there are large differences between rich and poor households in urban areas

### 2.2. International efforts to improve water and sanitation

Access to water and sanitation has been a major goal in development co-operation starting in 1977 when the World Water conference in Argentina acknowledged access to water supplies and sanitation as fundamental for development. Subsequently, international assistance for this sector grew especially during the Water Supply and Sanitation Decade from 1981 to 1990.

Access to water and sanitation is undoubtedly necessary to fulfill basic human needs. In 2001, the UN Committee on Economic, Social and Cultural Rights has adopted a general comment on access to water and sanitation as important part of the right to health. Almost ten years after this, the United Nations General Assembly adopted a resolution on July, 28 2010, which finally recognizing the access to clean water and sanitation as not only part of health but as a human right (UN, 2010/a). With this recognition, it was finally acknowledged that access to these services is strongly linked to people's well being.

Moreover, by including access to water and sanitation as part of the human rights, all states that have signed the resolution (including Nepal) have an immediate obligation to ensure a minimum amount of water to its citizens in order to prevent them from dehydration and

disease. In this respect, citizens in Nepal are having legal rights and are entitled to have a sufficient amount of water. This right-based approach is a fundamental shift from seeing people as passive recipients of water to empowered individuals who can claim their rights.

In order to achieve the MDGs, the World Summit on Sustainable Development in 2001 reaffirmed these goals. An agreement at this conference stated that access to basic sanitation is a crucial element of the poverty eradication commitments. Taking into account the positive effects of sanitation on public health and to the extent it can reduce poverty and support economic and social development, the General Assembly of the UN acknowledged the importance of sanitation by declaring the year 2008 as International Year of Sanitation (UN, 2009/b).

Although efforts by governments to improve sanitation coverage were made subsequently, progress on sanitation targets has been slow and uneven. As in other parts of South Asia, the majority in Nepal living in rural areas still lacks access to sanitation and to a lesser extent to water. When the government is unable to provide these services to its citizens, the private sector is believed to provide more efficient and reliable services instead. The next section will focus on shifting paradigms between nationalization and privatization in the water sector.

## **2.3. Theoretical debate on water and sanitation**

Water management has seen several shifts in thinking reflecting in various degrees the involvement of private and public sector and from top-down infrastructure delivery to more holistic and inclusive bottom-up approaches. This section provides a brief overview of the continuing debate in the water and sanitation sector.

### **2.3.1. Shifting paradigms to improve water and sanitation**

There are several distinctions characterizing a shift in paradigms about the best way to improve water and sanitation in less-developed countries.

On the one hand, Black (2003) distinguishes three main phases, the first one 'the appropriate technology phase' started in 1978 until 1988. This period was characterized by increased urbanization and growing demand of services in most parts of the world. It was accomplished by international efforts to meet the basic needs of people. A lack of water and sanitation services was mainly interpreted as a lack of practical and affordable models to implement facilities. In order to deliver sanitation services, most governments in developing countries relied on the expertise of donor countries. As a consequence, donor countries delivered plans drafted in their national offices to implement sanitation facilities in areas, without involving the targeted communities. At that time, urban sanitation including the promotion of low-cost alternatives to waterborne sewerage was the centerpiece of development interventions. This approach did not include the targeted community in any decision-making process or during the implementation phase. Consequently, as Prasain (2003: 123-124) concluded in a similar study: without community participation, people did not feel responsible to maintain these sanitation facilities since it seemed not part of their daily lives. As a consequence, water supply and sanitation facilities were poorly maintained, which led to a breakdown of facilities.

The second phase from 1988-1994 was a shift 'from hardware to software', including institutional and service management issues in development policies. Attempts were made to implement small-scale projects, including communities and upscale those projects when proven successful at the national level. Also increasing attention was given to the role of women in water management and waste disposal. The new approaches included not only

more aspects that required more time and extra investment, but also put emphasis on community participation. Therefore the targeted communities had to develop capacities and skills in order to participate successfully during a project.

The third phase lasted from 1994-1998 and was called 'promoting the new agenda', which was influenced by increased environmental awareness and fears concerning water scarcity and pollution. As a consequence, environmental aspects were included in water and sanitation policies and programs. At the same time, planners and policy-makers realized that these complex approaches required more time than available, slowing down the process of extending access to water and sanitation (Black, 2003).

Seppälä, on the other hand, makes a more rigorous distinction listing paradigmatic changes in water and sanitation policy thinking. Shifting from 'old thinking' where water quality, centralized water management, state provision and a supply driven approach dominated the water sector to a more inclusive, decentralized and demand-driven/demand-responsive approach. Along with the 'new thinking' came the acknowledgement that people have a right to water and also a tendency to privatize part of the water sector.

Gleick (2000) came to a similar conclusion as Seppälä, distinguishing between old thinking and more recent thinking. The author summarizes the ideas of the old thinking as relying on the outdated premise that new water sources had to be tapped in order to supply increased demands. In that sense, water management relied on increased numbers of dams, reservoirs and aqueducts to capture, store and move water. With increased awareness about ecological limits, these projects failed for environmental, economic and social reasons. Nowadays, the more recent thinking aims at including sustainable principles to serve the human need of water. Still, the author criticizes that sustainable aspects are not fully incorporated in water policies until today.

Many governments acknowledge that the provision of water and sanitation services has a very positive effect on health, hygiene and social development and can also contribute to economic development. Nevertheless, what looks good on paper does not necessarily need to be implemented properly. Unrealistic and impractical policies are drafted but not followed-up. Seppälä (2002) concludes that most water supply and sanitation policies are poorly designed. Common problems in water governance in developing countries are increasing water scarcity, stress along with deteriorating quality, poorly co-ordinated administration or excessive government involvement, inappropriate pricing of water and non-viable operational and financial performance (2002: 368). To implement successful policy and institutional reforms, political consensus and institutional change, the recognition and participation of all stakeholders and effective dissemination of information is necessary.

### 2.3.2. Water as a public versus economic good

Over the last 50 years, public services shifted from being provided by the state to be provided by the private sector.

As an answer to the past failure of supply-driven, top-down approaches, new paradigms emerged, including sustainability aspects to manage water resources. The Global Water Partnership has adopted the so-called four Dublin principles highlighting this new thinking by including sustainable and economic aspects in water resource management. The Integrated Water Resource Management (IWRM) aims at achieving a co-coordinated development and management of water, land, and related resources, by maximizing economic and social welfare without compromising the sustainability of vital environmental systems (GWP, 2003:1). Table 1 summarizes the core principles of the IWRM.



**Table 1: Integrated Water Resource Management**

<b>Integrated Water Resource Management</b>
<ol style="list-style-type: none"><li>1. Fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment.</li><li>2. Water development and management should be based on a participatory approach, involving users, planners and policy-makers at all levels.</li><li>3. Women play a central part in the provision, management and safeguarding of water.</li><li>4. Water has an economic value in all its competing uses and should be recognized as an economic good.</li></ol>

Source: GWP (2000: 13-14)

Especially the fourth principle led to an intense debate whether water should have a price. Funke et al. (2008) argue that it is important to distinct between the value of water, which enables the rational allocation of water as a scarce resource, and charging for water, which is an economic instrument to stimulate people's behavior towards decreased consumption. In this regard, water pricing can be seen as a mean to overcome exploitation of water resources. Many governments in less developed countries are unable to provide sufficient amount of water to its citizens. Therefore many people prefer services delivered by the private sector, even though prices for these services are higher. Yet, services provided by the private sector are assumed to be more efficient and the water of better quality.

Neo-liberal ideas dominated policy making throughout the end of the last century influencing governments in the North and the South alike. Consequences of this new thinking are also reflected in development cooperation. Neo-liberal ideas have to be included as part of the structural adjustment programs (PRSP) resulting in privatization of water utilities in cities in Latin America, Asia and Africa. Looking at the impact of privatizing of the water sector in these regions, Budds and Mc Granahan (2003) found mixed results. Although the involvement of the private sector was seen as a mean to achieve the MDGs, most of the investment was directed to urban centers, mostly in countries with remarkable economic growth. However, a large number of people in less developed countries still lives in rural areas or cannot afford to pay for water while living in urban areas (urban poor). So those people in dire need for water were often not targeted by privatized water services.

Yet, Budds and Mc Granahan (2003:92) see water as being essential to human life and therefore shared by all individuals. Although extensive water use can deprive others from using it, it is in most cases impossible to restrict others from consuming it as well. Since the private sector is usually unable to provide public goods, they must be subsidized and provided by the public sector.

Nevertheless, Budds and Mc Granahan conclude that the debate between public and private neglects the roles often played by civil society organizations, and lumps together very diverse actors and agencies in both the private sector (e.g. informal vendors and multinational corporations) and the public sector (e.g. public utilities, regulators, local authorities and national ministries) (2003:92).

Since the right to health and adequate amount of water obliges governments to provide water to their citizens, the privatization of water services excludes those who cannot afford to pay for these services. Especially in rural areas, where most people lack access to safe drinking water, the private sector is not providing these services because it is economically unfeasible. Therefore privatization of the water sector does not necessarily support the extension of services where they are most needed – in the rural areas. Keeping these

findings in mind, the question whether privatized water supply is able to deliver more equitable access in the rural area than if subsidized by the state is debatable.

Overall, whether the provision of water supply is better if provided by the state or the private sector is not the main issue in rural areas in Nepal. On the one hand, the private sector is active mostly in urban areas and has little interest to provide water in rural areas where settlements are scattered and most people are lacking sufficient income to pay for services. On the other hand, because the government of Nepal is relatively weak or not in place in remote areas, it is unlikely that the government provides anything else than a communal well shared by several communities. Therefore if an NGO provides a larger water supply system (community taps, hand pump, private taps), the community itself is mainly responsible to take care of it, once the project is completed. Therefore the theoretical debate most relevant for the rural context in Nepal is how communities can sustain these systems for a long time. The following sections will discuss what aspects are found to influence sustainability of rural water infrastructure and to what extent community management can enhance sustainability.

### **2.3.3. Water and sanitation in rural areas**

Socio-economic development and the availability of infrastructure are closely linked. Most PRSPs include investment in physical infrastructure such as roads, potable water systems and irrigation. Since access to services is a precondition for economic development, special emphasis is put to extend infrastructure to poor and marginalized areas. Still, policies and interventions emphasizing infrastructure have not evolved completely to support development, overall progress is slow particularly in rural areas (Barrios, 2008: 5).

Since rural areas are relatively isolated, lack or have inadequate access to basic services (health, social services, roads, water supply and sanitation etc.), delivering these services by the state or the private sector is a major challenge. When prioritizing what service should be provided first, opinions diverge. Barrios (2008) argues that the provision of rural roads can help to overcome isolation of rural areas and should therefore be favored over other physical infrastructure.

However, water and sanitation systems are defined as essential infrastructure throughout the literature. Jones and Silva (2009: 501) outline that these systems determine a community's health and safety, are closely linked to economic development and have an impact on multiple stakeholders.

Regardless of the benefits that may occur from these services, it is very costly to provide piped water and sanitation systems to dispersed rural communities and it is beyond the means of many governments in less developed countries. Therefore policies often focus on providing improved drinking water sources outside the home, like communal wells. In the case of Nepal, mainly female household members have to spend a lot of their time with fetching water at these community wells. Moreover, rural water facilities often fall quickly into despair because of poor maintenance (Zwane & Kremer, 2007: 2-3). In order to sustain water and sanitation facilities, it is crucial to involve local people in the maintenance of the system. The next section will discuss community management in more detail.

### **2.3.4. Participation and community management to achieve sustainability**

During the two Earth Summits in 1992 and 2002, many world leaders committed themselves to provide basic services to hundreds of millions of people who lacked access to water and sanitation for example. These goals are part of the Agenda 21. A guiding principle of Agenda 21 is to focus on community management, thereby strengthening local institutions in implementing and maintaining basic services programs. The cornerstone of community

management states that; if communities are involved in decision-making it will result in equitable supply of services derived from community empowerment (UN, 2009/a). Indeed, Doe and Khan (2004: 1) found many positive experiences in rural areas with community-managed services.

Community management is a terminology used in various ways. Some basic characteristics are summarized in table 2.

**Table 2: Community management**

<b>Community Management</b>
<ul style="list-style-type: none"> <li>• Bottom up approach</li> <li>• Community members decide on their own development</li> <li>• Community is responsible to manage, operate and maintain the system</li> <li>• Community has elected representative (e.g WSSC or WSUC)</li> </ul>

Source: adopted from Doe & Kahn (2004)

The major reason for advocating community management is the acknowledgement that people, who are targeted by a project, should have a major say during project implementation. Since they are the ones who potentially benefit from the project, they are also interested in maintaining these benefits for a long time. So in order to make community management successful, the community must not only participate at meetings but should also be involved in planning, decision-making processes and even contribute their money and/or labor (Doe & Khan, 2004). Nevertheless it is debatable whether community management requires contribution in cash and kind, and to what extent it is useful. Asking for cash or kind contribution from people who live from less than USD 1 per day is morally questionable. Still, there are valuable reasons justifying community contribution, such as increased ownership, familiarity with the system, decreased project costs etc.

As mentioned earlier, the PRSPs put not only emphasis on physical infrastructure investment, but also included community management as a key element. Moreover, international agencies such as the World Bank put a special emphasis on community-based development since the mid 1990s. As a consequence, funding for community-based development has increased from USD 325 in 1996 to USD 2 billion in 2004. The World Bank distinguishes between community-based development involving the community in design and management, and community-driven development, which goes further stating that communities have direct control over key project decision including management and investment of funds. Community driven development is seen as mechanism to achieve a variety of goals, see table 3.

**Table 3: Community-driven development**

<b>Goals of community-driven development</b>
<ul style="list-style-type: none"> <li>• Enhance sustainability</li> <li>• Improve efficiency and effectiveness</li> <li>• Poverty reduction can be scaled</li> <li>• More inclusive development</li> <li>• Empowering poor people</li> <li>• Building social capital</li> <li>• Strengthening governance</li> <li>• Complement market and public sector activities</li> </ul>

Source: World Bank (2004)

Doe and Khan argue that community management aims at empowering communities and enables them to take control of their own development (2004: 363).

Whereas the communities are at the center of the process, the role for the funding agency changes significantly as well: they become a facilitator, providing funds, technical support and guidance to the community throughout the project (de Silva, 2002).

Community-driven development and community management are said to achieve many different goals; reducing information gaps, expanding resources to the poor and increase capacity of communities by establishing organizations that represent their interests (Mansuri & Rao 2004).

Doe and Khan (2004) identify three key aspects that lead to successful results: (1) communities are small in size, mainly rural, and are occupied as farmers, (2) community members participate in decision-making, planning and implementation, and (3) there is strong community cohesion leading to ownership of the development project. However the authors also state that successful community management depends on the context, the external agent and other factors that are beyond the mere participation of community members.

In contrast, Mansuri and Rao (2004) define community-driven development as a three tire process stating that communities (1) use their social capital (2) to organize themselves and participate (3) in the development process<sup>5</sup>. In an extended summary of different qualitative and quantitative studies, the authors conclude that projects relying on community participation are not particularly effective at targeting the poor. Since most community based development projects are dominated by elites, quality of the project and targeting the poorest often fail and results are worst when large inequality within a community is prevalent. Also external agents strongly influence the success of a project. Additionally, facilitators are often poorly trained and/or inexperienced, leading to major challenges when programs are scaled-up rapidly. Overall, the authors recommend that community based development projects have to be context-specific, with a long time perspective and careful designed monitoring and evaluation systems.

So community-driven development projects are said to be a key element to achieve sustainability, still there are other aspects vital in order to sustain projects. The next section is elaborating on different aspects also influencing sustainability.

### 2.3.5. Sustainability in Water and Sanitation sector

Although water supply projects are designed to last for more than 15 years, they are often in very dire condition and need major rehabilitation after 5-7 years already. Several aspects influence the longevity of water supply and sanitation systems. Depending on the discipline, methodology and indicator used, there are various definitions how to assess sustainability. Resulting in various evaluation tools that are not accessible or simple to use in practice. This makes comparisons between cases notably difficult (Jones & Silva, 2009).

Sustainability is a term widely used nowadays and incorporates many different meanings depending on the context it is used for. Citing one of the most well known definitions of sustainability, the Brundtland Report in 1987 defines sustainable development as follows (UN, 2009a) *Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.*

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<sup>5</sup> *Community* in this context is defined as political, social, cultural or ethnic group within a defined geographical space. *Social capital* means part of the relations of power within a social system. *Participation* means the active involvement of members in a defined community in some/all aspects of project design and implementation thereby incorporating local knowledge (see also Mansuri & Rao, 2004).

Although the Brundtland Report definition is very broad and applicable to many disciplines, the definition was later applied more thoroughly to the water and sanitation sector. The Agenda 21 (UN, 2009a) states that: *by achieving sustainable development all people, regardless of their stage of development and social and economic conditions, have the right to have access to drinking water in quantities and of a quality equal to their basic needs*

Besides the definition in the Brundtland Report, there is a more specific definition related to infrastructure used by Mihelcic et al. (2007): *the design of human and industrial systems to ensure that humankind's use of natural resources and cycles do not lead to diminished quality of life due either to losses in future economic opportunities or to adverse impacts on social conditions, human health, and the environment.*

Mihelcic et al. emphasize that capacity building and sharing of indigenous knowledge is a way to achieve sustainable development (2007: 34-15).

Besides the hardware part to increase sustainability of projects, there are various institutional and social aspects equally important to enhance sustainability. These so-called software aspects include institutions, participation, social awareness and capacity building. Institutional arrangements for example are discussed throughout the literature. Doe and Kahn (2004) link participation and ownership to the sustainability of services. The authors argue, in their article on community management in Ghana, how participation and ownership depend on the community characteristics and enforce each other. In a similar attempt, Mansuri and Rao (2004) state that sustainability of community-based development initiatives largely depends on an enabling institutional environment, meaning that responsibility for maintenance is shared among different stakeholders. Moreover, the authors state that community leaders have to be downwardly accountable to other community members in order to increase sustainability.

Despite the positive attribution to community management and increased sustainability, Zwane and Kramer (2007) find another conclusion. While assessing the effectiveness fighting diarrheal diseases in developing countries, the authors neither find convincing empirical evidence that providing community-level rural water infrastructure substantially reduces diarrheal disease nor that this infrastructure can be effectively maintained by local user-committees. Especially in rural areas, the water sector suffers from externalities, weak fundraising capabilities and generally weak local institutions. Therefore community level maintenance of water facilities jeopardizes the sustainability of infrastructure in the long run.

With regard to participation, international donors such as the World Bank have adopted policies stating that around 30% of the local user-committees have to be female. Assuming that the inclusion of women will improve the management of collectively owned natural resources because women have high social capital (Agarwal, 2000). Additionally, since women are major users of these goods, their involvement will ensure rules relevant for compliance (Zwarteveen & Meizen-Dick, 2001).

However, it is difficult to assess the impact of women's involvement in public goods management, especially due to concerns about reverse causality: it is difficult to prove whether participation of women leads to the desired outcome or whether increased female participation is a result of the outcome (Zwane & Kramer, 2007: 13-14). Zwane and Kramer (2007) finally argue that little is known about the effectiveness of combined interventions such as water supply coupled with health and hygiene training, therefore more research is needed to assure when these complementarities are relevant and effective.

Barrios (2008), Busari (2009) and Pokhrel and Viraraghavan (2004) write about sustainability of rural infrastructure and criteria to improve life span of these facilities. The three case studies focus on the Philippines, Swaziland and Nepal and will be shortly described (table 4).

**Table 4: Sustainability aspects of WatSan projects in the Philippines, Nepal and Swaziland**

<p>Barrios (2008: 7) outlines in his case study about the Philippines that rural infrastructure is sustainable if four strategies are accompanied:</p> <ul style="list-style-type: none"><li>• Local level planning</li><li>• Labor-based technology</li><li>• Small-scale contracting</li><li>• Rural infrastructure maintenance system</li></ul>
<p>Pokhrel and Viraraghavan (2004) find that development interventions in Nepal related to water and sanitation can decrease the incidence of diarrhea most if:</p> <ul style="list-style-type: none"><li>• Environmental awareness, hygiene training, knowledge about the cause of diarrhea and behavior change related to social beliefs are included in the intervention</li><li>• Public participation in interventions and the involvement of women in design of water and sanitation systems areas ensured</li><li>• Environmental health and sanitation information is included in school education programs</li></ul>
<p>Busari (2009) has a more project specific evaluation about a water and sanitation project in Swaziland, the author states that sustainable outcomes can be achieved if projects implemented by several actors are jointly proposed, packaged and monitored according to the work plan and measurable indicators. Busari continues with listing several aspects crucial to achieve sustainable outcomes, in sum:</p> <ul style="list-style-type: none"><li>• People's preference is a continuous water supply from a hand pump rather than a closer communal standpipe where water supply is intermittent</li><li>• Scheme rehabilitation is a trade off between the costs of repair and the benefits for the community.</li><li>• Promoting sanitation and the physical construction of pit latrines are context-specific and have to be planned accordingly, while keeping in mind that household demand for sanitation is not necessarily equal to the demand for water supply</li><li>• A well coordinated and carefully designed hygiene education is necessary to improve health conditions</li></ul>

In sum, all articles emphasize to some extent that the participation of community members in general and that of women in particular is necessary to increase sustainability of rural WatSan or other infrastructure. Additionally, to make maintenance successful, a broad health and hygiene training and the institutionalization of maintenance according to local circumstances are important.

Although other factors influence the sustainability as well, it is very important to have a well functioning maintenance system in place. Although participatory projects are more likely to be sustainable in rural areas compared to top-down projects, they also suffer institutional support by the respective government bodies. So without constant lobbying by communities to receive support from the respective government body, the sustainability of projects is limited to a third of the timeline, as they were designed in the first place (Doe & Kahn, 2004: 33).

## 2.4. Conclusion

This chapter provided an overview of the current trends of water and sanitation on the agenda of international development cooperation. Since the mid 1970s, international awareness about the necessity to improve water and sanitation coverage grew remarkably and culminated in the formulation of the MDGs, which had to be included in national planning afterwards. The theoretical debate showed a shift from top-down, centrally planned interventions to more inclusive, participatory and bottom-up approaches while at the same time segments of the water sector were privatized. Although private water delivery is said to lead to more efficient outcomes in urban areas, it does not necessarily improve living

conditions in the rural context. Because settlements are scattered, infrastructure weaker and water delivery economically less feasible than in urban areas, privatization focuses not largely on rural areas.

After acknowledging that top-down projects did not sustain for the designed lifespan, many organizations adapted their approaches and included community-based development projects. Assuming that since communities do not only participate during the project but are also interested to maintain the rural infrastructure and the benefits that derive from facilities such as water supply, it is more likely that community-based projects are sustained for a long time. In order to assess sustainability of such projects, various evaluations tools are used. As every discipline has its own definitions of sustainable infrastructure, comparisons between different projects become notably difficult. Nevertheless, some core ideas to assess the sustainability of the Fund Board projects were found in the literature and presented in this chapter.

Chapter 3 will describe the methods used for this research and present the national and local context in more detail.

### 3. Research Methodology

This chapter will outline the main objective of this study, followed by the main question and several sub-questions. The conceptual model helps to clarify how water and sanitation are organized institutionally and how the Fund Board projects fit into establishing sustainable water and sanitation systems. After that, the six sustainability aspects are defined in more detail before the Fund Board modality is shortly described, followed by a brief overview of the methods that are used. Finally, aspects limiting the sustainability assessment are described along with other aspects influencing the research internship in Nepal.

#### 3.1. Research objectives

This study focuses on aspects influencing the longevity of Fund Board projects in rural areas in Nepal. Since access to water and sanitation is crucial for development especially in rural areas, it is vital to understand what aspects make projects successful and how water supply systems can be maintained once the implementing organization left the community. The Fund Board is funded by the World Bank and is a key player in the water and sanitation sector in rural areas. Important lessons from the Fund Board experience can also be shared with other organizations working to improve water and sanitation in rural areas.

This study focuses on three projects implemented in the Central and Western regions of Nepal. Looking at two villages in the Southern Terai and one in the hilly areas West of Kathmandu, the study looks at financial, social, health and hygiene, institutional, technical and environmental aspects influencing the respective projects' sustainability. The study answers the following main question:

***What aspects influence the sustainability of Fund Board water and sanitation projects for rural communities in western and central Nepal?***

The outcomes of this study are as follows: on the one hand, it analyzes how different factors influence the sustainability of a WatSan project and at the same time evaluates the effects of the WatSan projects on the three selected communities. In order to provide a detailed feedback for the Fund Board and World Bank for improvement, a variety of stakeholders were involved during the research period in Nepal. Furthermore, this study provides valuable background information for UN Habitat and a PhD study comparing sanitation approaches in Nepal. UN Habitat intends to publish a document summarizing experiences in the water and sanitation sector, listing best practices and thereby including approaches from various organizations. Because documentation is weak in Nepal, there is a need to collect information and exchange experiences in order to share it with different stakeholders working in the water and sanitation sector.

#### 3.2. Research questions

In order to answer the main question, sub-questions related to different aspects are formulated, extending the scope of the main question. The following graph summarizes the key elements relevant for a sustainable water and sanitation project.



**Figure 1: Sustainability aspects**

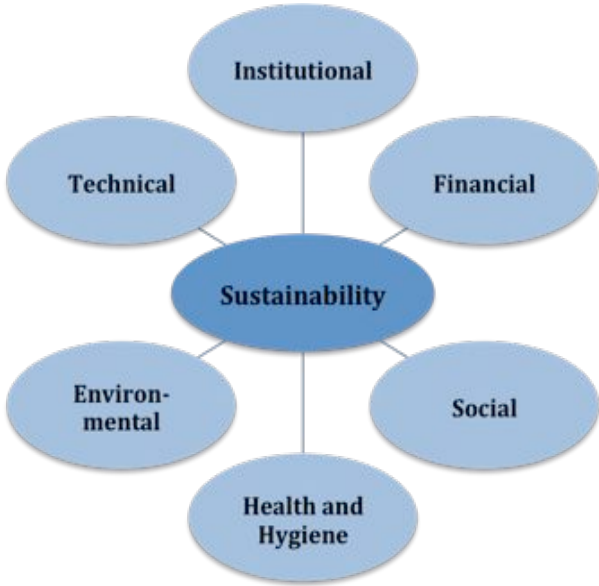


Figure 1 illustrates six main aspects influencing the sustainability of a water and sanitation project. These six were chosen to cover several topics that are assumed to play a role in achieving sustainable projects, which are benefitting the community. The different stakeholders are asked questions related to these six topics. Some aspects are more relevant for sustainability at the beginning of the project, while others are crucial once the project is completed.

Besides the main research question, there are three additional questions that have a more general scope (see table 5). Additionally, sub-questions related to the six sustainability aspects are included as well. A very detailed list of sub-questions can be found in the Annex.

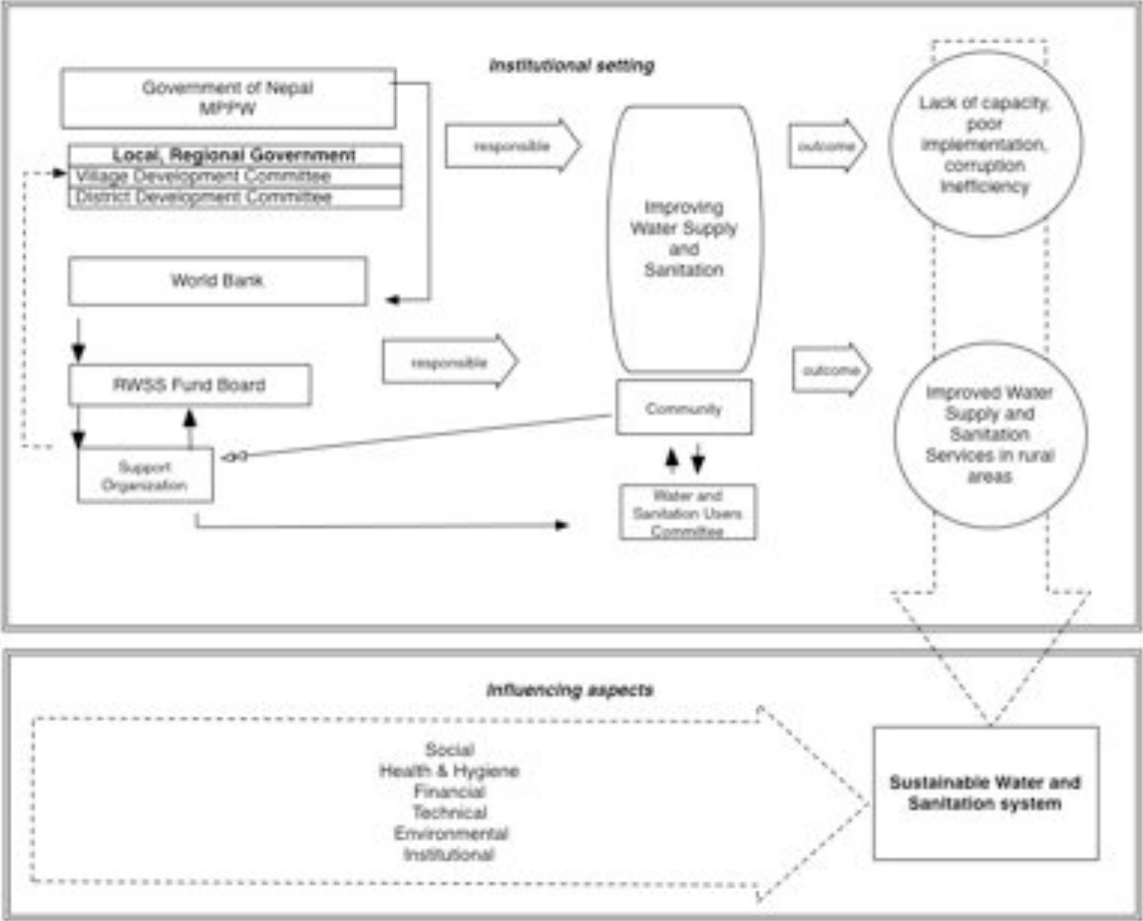
**Table 5: Additional sub-questions**

<b>General Aspects</b>
<ul style="list-style-type: none"> <li>• Does the community initiate the project and what is the participation level of community members during the project?</li> <li>• What are the major challenges and drawbacks of the Fund Board project and how can it be improved?</li> </ul>
<b>Additional Sub-questions</b>
<ul style="list-style-type: none"> <li>• How are different stakeholders involved during and after the Fund Board project?</li> <li>• To what extent are the needs of the community fulfilled and is everybody benefitting equally?</li> <li>• What is the financial contribution from different stakeholders (community, Fund Board, SO, VDC, DDC) for the water and sanitation system and how is it maintained afterwards?</li> <li>• What is the environmental condition in the village, at the water source, the state of toilets and how is waste managed?</li> <li>• What are the major impacts of the water supply system and sanitation on the daily life of people?</li> </ul>

### 3.3. Conceptual framework

The conceptual model (figure 2) illustrates how projects in the water and sanitation sector are organized and how the Fund Board project fit into this setting. Furthermore, this study looks at the impacts of aspect in the lowest arrow and investigates on the relationship between the Fund Board projects and the government bodies.

Figure 2: Conceptual model<sup>6</sup>



The government of Nepal aims at improving access to WatSan throughout all districts. The actual responsibility to implement this infrastructure is within the DDC and VDC. Due to political weakness, lack of funds, knowledge and capacity, the local and regional government bodies are not able to meet the demands of communities. Instead, the Fund Board, NGOs and INGOs are providing such services to the communities. In case of the Fund Board, the community ideally contacts the SO. The SO then submits a proposal to the Fund Board and once the local and regional institutions approve it, the project cycle starts. If the project is implemented, there are several aspects influencing the sustainability of the water and sanitation facilities, including the project planning and implementation and other aspects as seen in the arrow.

On the one hand, this study focuses on project initiation and participation of stakeholders,

<sup>6</sup> The black arrows indicate a stable and continuous relationship. The white arrow from the community to the SO indicates that the community should establish contact the SO. The dashed arrow from SO to VDC,DDC indicates a relationship unknown how stable and frequent it is. The two large dashed arrows are assumed to influence sustainability of the systems, however their relevance is yet to discover.

and on the other hand analyses how the six aspects influence the sustainability of the WatSan system.

### 3.4. Defining sustainability assessment

This section briefly describes how poorest community members are defined and what the six major sustainability aspects means.

In the following sections, ultra poorest and poorest community members are mentioned. The criteria of selection of these households is based on the definition of the international poverty line<sup>7</sup> defining ultra poorest as living from less than USD 1 a day and the poorest from USD 2. So depending how much money a household spends, their poverty level can be assessed. Table 6 summarizes the definition:

**Table 6: Poverty category**

	Per Day	Per Month
Living from less than US\$ 1 per day	Rs. 74.70	Rs. 2,241
Living from less than US\$ 2 per day	Rs. 149.40	Rs. 4,482

World Bank (2010)

In order to understand the six specific aspects to assess sustainability of the WatSan project, the table 7 summarizes the major concepts.

**Table 7: Sustainability aspects for research**

	Topic	Description
Institutional	Stakeholder involvement	Involvement and decision making of community, WSUC, school during the project
	Coordination with government	Influence and involvement of VDC and DDC during project and financial responsibility after the project
	Maintenance	Institutional mechanism to ensure financial and technical maintenance of the water supply system
Social	Participation	Type of participation of community members, community groups and WSUC during project
	Equality	Involvement of minorities (ethnic, gender, socio-economic) during project
	Pro-poor	Effects of project on poorest households
	Time saved	Importance of timesaving for women and time used for income generating activities
	Education programs	Role of school to emphasize behavior change <sup>8</sup> at community
Health and Hygiene	Hygiene behavior	Frequency of toilet use and hand washing practices, OD elimination
	Water treatment	Frequency of water treatment before and after project
	Improvements	Decrease of water-borne diseases

<sup>7</sup> The new international poverty line defines poverty as living from less than USD 1.25 a day (USD 2 respectively) based on data from 2005 (see World Bank 2010, Purchasing Power Parity terms).

<sup>8</sup> Behavior change in this context means to provide training to community members, which increases their awareness about the link between sanitation/hygiene and health. Absolute behavior change means people are using only toilets for defecation and to urinate, wash their hands before critical junctions (before cooking, serving food, eating etc.) and to keep their household and their environment clean, so the risk of illness, especially water-borne diseases like diarrhea, can be diminished.

Technical	Water Supply construction	Amount and quality of water sufficient, condition of facilities
	Technical options	Choices for water supply and toilet system adequate
	Toilet construction	Problems with of toilets
Environmental	Condition	State at water source, intake, transmission line, collection tank and taps
	Toilet use	Frequency of toilet use, state of toilets
	Waste management	Organic and inorganic waste treatment and collection
Financial	Implementation	Financial mechanism for WatSan planning and implementation, investment, contribution from each stakeholder
	Maintenance	Operation and maintenance mechanism
	Subsidy	Type and amount of subsidies in community for toilet construction

### 3.4.1. The Fund Board project cycle

The project cycle is described in detail under section 4.6.2. The six aspects play an important role at various stages during the project cycle. The following section provides a more detailed understanding of table 7 and describes how these aspects influence sustainability of the water supply and sanitation system. Three main phases of a project are described here: initiation, planning/implementation, and maintaining/operation.

At the very beginning of a project, the community expresses its needs by addressing the government or an NGO for support to improve infrastructure such as water and sanitation. However, so-called community-driven projects are not necessarily reflecting what the community really wants. There is a delicate difference between asking for support or of being told what the community's needs are. It is more likely that community priorities do not focus on improved sanitation but rather on having access to rural roads. Nevertheless, whether the community approaches the NGO, or an external agent recommends a specific project, matters in terms of ownership and can influence the success of community management once the project is completed.

During the planning, implementation and management of the schemes it is important to include two main aspects: (1) integrating health and hygiene programs with water supply and (2) participation<sup>9</sup> of women, girls and ethnic minorities during the project (World Bank, 2010). However, participation alone does not ensure people change their sanitation behavior and that health and hygiene training are effective. Especially Zwane and Kremer (2007) find that poverty hinders behavior change especially among the poorest. The authors specify that education on health and hygiene is costly and less effective if literacy among mothers is low (2007: 7). So whether all community members change their behavior is not so much a question of spreading information but influenced by a variety of factors (continuous awareness training, motivation of health/hygiene facilitators, cultural norms, gender norms, social control in community and household, etc.)

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<sup>9</sup> Participation in this context is defined as being actively involved in decision-making processes and with actual power to control the process and the functioning of the scheme afterwards.

Yet another issue to consider during the project is the composition of the WSUC members. Since the SO mainly works with the WSUC, the other community members might not be extensively involved. Community participation can range from providing information up to full participation during meetings, planning and construction phase. To what extent the other community members are involved during the project, influences not only who is targeted by the intervention but also whether the facilities are accepted and maintained by the community. Mansuri and Rao (2004) conclude that most community-based development projects are elite-dominated and do not necessarily target the poorest of the community (2004). Because poorer households have lower social capital, are less educated and less mobile, the better off households are usually the ones in regular contact with local government bodies and NGOs. Therefore community-driven project do not necessarily mean that benefits are shared among all community members. So while assessing how a project was initiated and implemented, community participation needs to be critically reviewed.

Once the project is completed and the implementing organization has left, the WSUC/ community is responsible to maintain the system. Software aspects such as health and hygiene training, but also training on maintenance of toilet and taps, play an important role. Cultural norms influence whether family members are allowed or prohibited to use the household's toilet. Therefore increased awareness is necessary to ensure that all community members are no longer defecating in the open. If compliance to use toilets is weak, the health of the entire community is challenged.

Besides health and hygiene training, financial and institutional aspects are relevant to sustain the hardware as well. When the water supply systems and sanitation facilities are damaged by natural hazards and/or poor maintenance, repair or a complete rehabilitation is required. Whether the WSUC/community members repair the system depends on whether they have the financial means, technical skills and can profit from an enabling environment. Busari (2009) argues that rehabilitation of facilities is a trade off between costs for the community and to what extent the community benefits. Therefore institutionalizing community management after project completion is necessary but not sufficient to ensure facilities can be maintained. Yet, in the case of Nepal, financial support for maintaining water supply systems is a mandatory task of the VDCs and part of their annual development budget. So in order to enhance the financial sustainability after project completion, it is advisable that the SO and WSUC members keep in contact with the VDC and ensure their financial contribution for maintenance.

### 3.5. Research methods

This section briefly summarizes the different research phases during my internship in Nepal. It also describes, how different methods are used to obtain the data and information the Fund Board projects.

A combination of quantitative and qualitative methods was helpful in understanding the scope and impact of the three water and sanitation projects in rural Nepal.

Before going to Nepal, a broad literature review helped to understand the main international, national and context-specific factors in the WatSan sector. Several academic papers on water and sanitation in developing countries were used and additional information by multilateral organizations like the World Bank, UN Habitat, OECD but also NGOs such as Water Aid and ENPHO were included during the desk research. Also a meeting with the director of the Swiss organization Skat helped to understand the main issues in the WatSan sector in Nepal.

Table 8 provides a summary of the different methods used during data collection in Central and Western Nepal.

**Table 8: Research strategies**

Research strategy	Target	Quantity
Unstructured Interviews	Government/policy makers and NGO members in WatSan sector	31
Semi-structured interviews	Fund Board, SDRC, NRCS, government officials for WatSan at VDC, DDC level	7
Structured interviews	Chairman of WSUC	3
Focus Group discussion	WSUC members	3
Household Survey	Members of households in 3 communities	97
Observation	Water supply system, Toilets	3, 18

The first weeks in Nepal were spent to get familiar with the main actors and their programs in the WatSan sector. A variety of stakeholders were met in February and March, including officials from DWSS, DoLIDAR, Fund Board, World Bank, and different NGOs. Thereby valuable information was gained and possible research opportunities discussed. After deciding to focus on the Fund Board projects, the first meetings with regional NGOs such as Nepal Red Cross Society (NRCS) in Damauli and Pokhara and the Social Development and Research Center (SDRC) in Goidakot were held.

Later, eight different communities in Kaski, Tanahun and Chitwan district were visited and their water supply systems examined. To make comparison more meaningful, three schemes were finally selected. At this time, contact to the chairman and to the members of the WSUC was made and a first scoping interview was carried out.

Later in April, the actual field-research was carried out with the help of 2-3 research assistants within each community. First of all, a focus group discussion with the WSUC members and members of the WTSS helped to understand how the community/WSUC was included and on which aspects they had an influence during the project. Later a structured interview with the chairman of the WSUC provided more factual information. After that, the household survey was carried out with around 30-34 respondents per community. After a semi-structured interview with the head of school, the VDC and DDC secretary (DTO or WatSan co-ordinator) were interviewed. At the end of the field research, the SDRC/NRCS were visited and final questions were addressed in a semi-structured interview. This was also a first opportunity to give a feedback from the communities (and VDC, DDC) to the SOs.

Then in May, data from the household survey was entered and analyzed, interviews and information organized and reviewed. Later the final presentation at Fund Board with officials from the World Bank helped to clarify questions and led to a fruitful discussion among all participants. Finally the meeting at UN Habitat helped to get a more complete overview of how WatSan projects are implemented and how sustainability is challenged by many factors in Nepal.

Regarding selection of the schemes, the Fund Board suggested to visit the SOs NRCS in Tanahun and Kaski. While visiting a project in Kahun near Pokhara, it was found unfeasible to ask people to what extent they participated during a project, which was implemented a long time ago. Therefore after meeting another regional NRCS in Damauli, the engineer recommended seeing the project in Chintutar implemented in batch 6 (completed in 2008). Since my study focuses on aspects of participation and cooperation between actors, I found it more feasible to select schemes that were implemented in Batch 6 or 7. Assuming that stakeholders still remember their involvement during the project and can provide detailed

information about the different phases of the project. Also the incidents of water borne diseases will be remembered better if projects were recently completed.

After having seen projects in Tanahun and Kaski district, I thought it valuable to focus on projects implemented in a very different environment than the hilly areas. Since the Terai is one of the most densely populated regions in Nepal and water scarcity is more pronounced than in hilly areas, I thought comparing projects in hilly areas and the ones in the Terai would provide additional information about the Fund Board projects. Since many people migrated from the hills to the Terai over the last 50 years, the way communities are composed differs from those communities in hilly areas that have low immigration.

After getting information about the SDRC in Goidakot (near Bharatpur/Narayanghad) from the Fund Board, I met with the staff from the NGO and visited Sital Tole and later Madhavpur second with my research assistants.

So besides the willingness of the WSUC members in Chintutar, Sital Tole and Madhavpur second to participate during the research, accessibility via local transport was also an important criterion to select the three communities.

The selection of houses during the household survey was done at the time visiting. Detailed maps about the VDCs in Tanahun and Chitwan district were not available. Also the communities only had very basic schematic maps about their communities. During the household survey a stratified random sample was used, including a variety of households (ranging from temporary, poorly equipped, to semi-permanent with tile roof, up to permanent houses) reflecting different socio-economic classes. Because of the small size of Sital Tole with only 72 households, the sample size for the household survey was set at 30-35 households. In order to include a variety of all houses, 1-3 households were selected sharing one tap. So in Sital Tole three households sharing one tap were selected for all 10 taps. Consequently, one or two households sharing one tap were included in Chintutar (15 taps) and Madhavpur second (22 taps).

### **3.6. Limitations of research**

This section summarizes the main challenges to carry out research in Nepal. The first section is related to limitations assessing sustainability, whereas the second section summarizes challenges to and limitations of carrying out research in Nepal.

#### **3.6.1. Limitations to assess sustainability of projects**

Having different disciplines using the term sustainability, it is difficult to determine what the meaning of a sustainable project is. Depending on the background of the evaluation agency, different aspects will be considered important. Therefore aspects that are included during this study might be irrelevant if someone else repeats the evaluation and considers other aspects.

Methods and techniques used during the Bachelor and Master studies were applied to carry out this study. So this thesis has shortcomings in terms of technical, operational assessment. Since my studies were not in the field of civil engineering, the research scope especially for technical aspects is rather limited, deriving mainly from personal observations. Since mainly qualitative data was collected, validation of the findings is challenged. For example, observations about the participation of women during the focus group discussion are based on subjective interpretation rather than objective assessment. Similarly conditions of the water supply and the environment were not measured but rather observed. So it is important to keep in mind the way data was collected, when reading the main conclusions.

During the household survey it became clear that certain questions were very personal and eventually intimidating (hygiene behavior), so respondents would either respond what is socially accepted and/or not be honest. Another challenge during the household survey was that many respondents were not aware of the incidents of diarrhea in the past two years, so very few answered questions about their health. Therefore it was challenging to assess whether health and hygiene training was successful and who was targeted during the development phase.

Finally, including schemes implemented in different batches would best assess sustainability of Fund Board projects. To see schemes after two years of project completion is entirely different than schemes that are more than ten years old. Thus sustainability of schemes varies over time. Unfortunately this could not be included in this study due to financial constraints and limited time.

### 3.6.2. Further limitations during research

Initially it was a very difficult to get in contact with UN Habitat and confirm the internship position. Communication is less frequent if UN Habitat staff is abroad, correspondence via E-mail is not as common as in Europe, and therefore responses got delayed. Because the internship position got only confirmed one month before departing, preparation was not sufficient. Thus the scope from focusing on sanitation in peri-urban areas changed to water and sanitation in rural areas implemented by the Fund Board. Although there is a general interest in understanding other approaches used in the WatSan sector by various actors, the need of UN Habitat to carry out an academic research on WatSan in rural areas was exiguous. Similarly, the Fund Board hires consulting agencies to evaluate their programs regularly, thus the need of analyzing three different projects is not given<sup>10</sup>.

At the time in Nepal, there were numerous obstacles in terms of infrastructure. Especially the power cuts leaving Kathmandu city without electricity for 11 hours a day had an impact on research. Power cuts in other cities such as Damauli or Narayangadh were also challenging. Besides power cuts, there were problems related to transport. On the one hand, there were a number of road blockages (Bandha), especially in the Chitwan district in April and May. On the other hand, selection of schemes was quite limited to those settlements that were accessible by road and or public transport. Relying on private transport was expensive and therefore the amount of schemes that could be included in this study is limited.

A key shortcoming of this thesis is that it examines only three schemes so that statistical hypothesis testing fails to adequately account for the fact that the Fund Board interventions are provided at the community rather than the household level. In order to make a statistically meaningful comparison between communities, at least 40 communities should be included, 20 communities with a Fund Board project and 20 communities without any support (see Esrey, 1996).

Also because of accessibility and transport, schemes in very remote areas were not visited. SDRC and NRCS recommended a number of schemes and it is not clear what selection criteria the two NGOs had. If the three selected schemes represent other projects in more remote areas is unknown.

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<sup>10</sup> Still, while including a variety of stakeholders during the field-work, this academic research reflects a broad view on advantages and limitations of Fund Board projects and was highly appreciated by the Fund Board and the World Bank staff members.



Generally officials at the main offices in Kathmandu were able to communicate in English, however if a native Nepali speaker attended the meeting, the discussion was held in Nepali. Similarly, people in the villages only spoke Nepali or other languages/dialects and it was impossible to communicate in English. Therefore around 80% of the findings are a translated summary of my research assistants and knowledge gaps are likely to have occurred.

Another issue around language difficulties happened during the focus group discussion with the WSUC members. It is advisable to not interrupt discussions in order to translate from Nepali to English. Instead, one of the research assistants wrote down the main discussion points in English, so part of the discussion could be followed. During the household survey though, translation was not possible and due to time constraints left undone. Language barriers largely influenced the understanding and interpretation of interviews and other information.

Moreover, after completion of the fieldwork, it was a challenge to enter the household surveys written in Nepali. Inconsistency in the way questions were organized made the data entry more time consuming. Also some of the respondents gave multiple answers, therefore categories had to be created or adapted afterwards. Also while entering data at UN Habitat, many knowledge gaps during the household survey emerged. For example the household survey did not ask about the income directly, but only asked about the monthly expenditure. While relying on the expertise of staff from UN Habitat and research assistants, certain questions were left out that could have been useful.

Furthermore, because different research assistants were hired for each community, the type of questions and their meaning was understood in different ways. A prevalent costume in Nepal is to not admit if a mistake was made. Therefore it occurred that research assistants did not understand the meaning of a question but would only ask at the end of the survey what it actually meant. So the way questions were asked during the household survey were not homogenous.

During the field work there was a tendency to be biased towards the chairmen's opinion or the one from the WSUC members. There was also a gender/age bias during the field research. Although the household surveys were carried out randomly, mostly young women or older men had time to answer questions, because the planting season required that most adults worked in the fields during the day.

Overall officials working in the water and sanitation sector in Nepal are mostly men and it is challenging to know what type of behavior is appropriate when meeting stakeholders. Moreover, at the end of a meeting, men do not shake hands with women but do so with other men. Generally because there is little interaction between men and women in Nepal, male stakeholders interviewed had a hard time answering questions directly, but would always talk to the male research assistant instead.

Finally this thesis reflects a variety of opinions, values and personal experience. Still, it is not possible to represent all different and contradictory opinions expressed by the people who participated during the research. Also the main findings are limited to the answers and translations received by other people and own interpretation. Therefore generalization of findings is only possible to a certain extent, and findings have to be understood in the current context of this research.

### 3.7. Conclusion

In sum, this chapter presented the objective, research questions and sub-questions. The conceptual model showed how the Fund Board fits into the institutional context of the WatSan sector. After that, the six sustainability aspects were described and links to the theoretical debate in chapter 2 were made while discussing how the Fund Board modality is set up. Then the methods used were briefly mentioned, thereby listing all relevant stakeholders interviewed. Also the chapter summarizes briefly the selection process of the three communities, which were part of this study. A detailed description of factors limiting to assess the sustainability of the projects was listed. This chapter ended with a description of factors influencing to carry out research in Nepal.

## 4. National and Regional Context

This chapter gives an overview of Nepal's environment, its history and politics. Also it describes economic and social aspects influencing the state of the country today. The second part then provides information on water and sanitation coverage in Nepal, the impact of low coverage and policy responses to improve access. This chapter also presents two other important approaches in rural water supply and sanitation sector. Subsequently the regional context of Tanahun and Chitwan district, selected for this study, is presented. Then the three communities are introduced, basic information is given, which is relevant to understand under what conditions the SDRC and NRCS implemented the Fund Board.

### 4.1. Geographical context

Nepal is a landlocked country in the Central Himalayas between India and China, with 28.5 million inhabitants and it covers an area of 147,181 sq km. The country shares its borders with the Tibetan Autonomous Region of China in the North and is surrounded by India in the East, South and West.

**Map 1: Nepal situated between China and India**



Source: UN OCHA (2010)

Nepal is divided into five geographic zones: Terai plan, Wiwalik hills, Middle Mountains, High Mountains and the High Himalaya. The country has enormous differences in altitude and is home to Sagarmatha<sup>11</sup> (8848 m), the highest peak in the World, but has also low-lying areas that are only 80 meters above sea level (OECD, 2003).

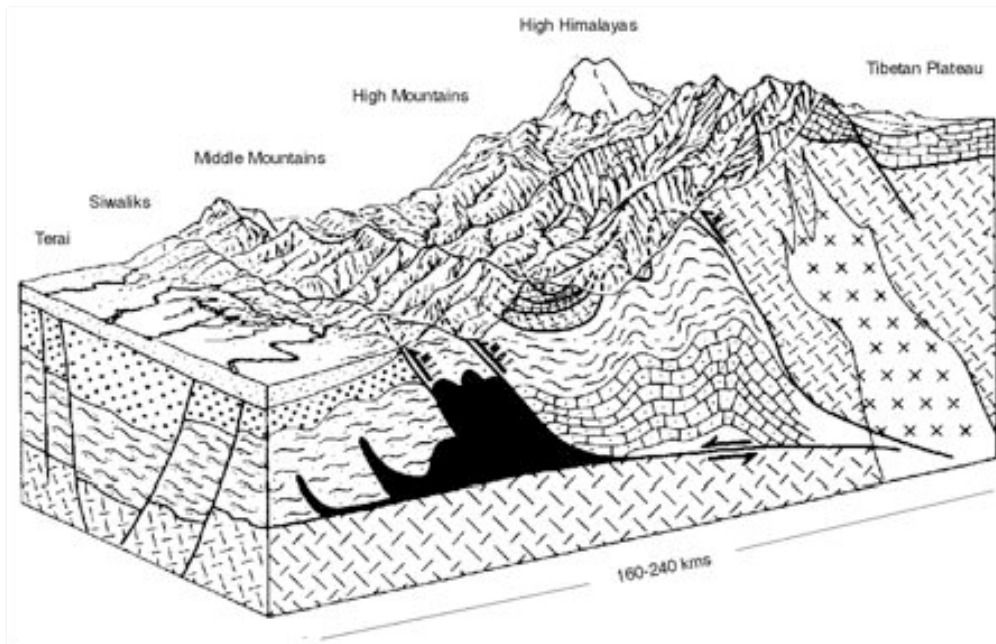
Nepal has more than 6000 rivers and rivulets that have an estimated annual runoff of about 225 billion cubic meters. Due to extreme spatial differences, climate variation is large in

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<sup>11</sup> Sagarmatha is the Nepali name for Mount Everest.

Nepal – ranging from tropical to arctic climate within only 200 kilometers. Figure 3 shows these spatial differences in a schematic way.

**Figure 3: Topological sequence of Nepal**



Source: OECD (2003)

The country is influenced by the monsoon during June to September, which brings about 80% of annual rainfall (ADB, 2009/a). Although Nepal has permanent snow and ice plus heavy rainfall, water availability is scarce, especially in Kathmandu Valley and Southern Nepal and in the months before monsoon starts.

The impact of global warming has severe effects on the Nepal Himalayas: manifested in terms of glacier retreat and increases in size and volume of glacial lakes. The continuation of glacier retreat can also reduce river flows during the dry season (March-May). It is estimated that monsoon rain will intensify, which is expected to enhance the variability of river flows. This trend has major impacts on hydropower, agriculture and human health, but also on Nepal's ecosystems and biodiversity. Nepal's electricity infrastructure relies to 91% on hydropower (OECD, 2003) and is already negatively affected by water shortages. As a consequence of heavy rainfall combined with severe thunderstorms, landslides and flooding are common in Nepal. Therefore many farmers see their fields flooded or washed away because the soils can often not absorb the amount of water during monsoon months. With more intense monsoon rains, food security becomes more challenged as well.

Although Nepal has impressive landscapes, the state of the environment is alarming. Nepal's growing population is putting pressure on the natural resources, especially water, land and forest. Deforestation, as a result of overusing wood for fuel, is widespread and increases soil degradation even further (CIA, 2010). Outside the national parks, wood is the most common fuel for cooking. The amount of firewood needed is likely to increase along with rising numbers of trekkers, resulting in clear-cut hills around villages. This makes wood collection not only more time consuming but also increases soil erosion. Besides wood for cooking and heating, forests are clear-cut to provide room for crops, livestock and human settlements.

In urban areas environmental problems are severe: water is highly contaminated with human and animal wastes, agricultural runoff and industrial effluents running directly into the rivers. Also water availability is challenged in urban areas because of the uncontrollable in-migration, the ageing of the water infrastructure and climate change affecting availability and

quality of water (Zhou et al., 2009). Moreover, urbanization and the growing numbers of roads, houses, and schools requires more wood for construction. Although industrial activities are limited, the brick kilns near urban centers combined with increasing traffic are major causes for air pollution.

The increasing environmental degradation in urban and rural areas contributes to poverty as more and more people find it difficult to rely on natural resources to meet their needs. The degradation of natural resources (air and water pollution, decreased soil fertility etc.) is a major challenge to achieve sustainable development in Nepal.

## 4.2. Historical context

There are different versions about Nepal's early history, the Buddhist and Brahmanic Hindu for example mention the legend of early settlement around the 4th and 5th century CE. Several dynasties left their imprints on Nepal's culture, explaining to a certain extent also its heterogeneity in religion, ethnicity and languages. Nepal's history is also characterized by shifting power of different indigenous groups over the last 1500 years. In the early 18th century, the Gorkha ruled by the Sha family began to dominate the political life in the Kathmandu Valley and in the Hills (EB, 2010). It was in 1768, when Nepal got united under the rule of the monarch with the alliance of the Hindu high castes, who dominated the political, social, and economic power structures and the administrative system (Haug, 2008: 5). Disputes and confrontations between the royal and aristocratic families characterized Nepalese politics until 1951 (EB, 2010).

The monarch (King Tribhuvan) ended the traditional system of rule by hereditary premiers and established a cabinet system in 1951. The introduction of democratic institutions in Nepal appeared to be a persistent controversy and resulted in an ongoing conflict between the monarch and the cabinet, which resulted in the dissolution of the parliament in 1960. Nepal was then ruled several years by the monarch. Attempts to re-establish political parties in 1990 were made, which successfully resulted in a multiparty constitutional monarchy in 1990 (CIA, 2010 and BE, 2010).

The more recent history has brought enormous political changes. Starting in 1990, along with the new constitution, political parties and democratic elections were held (Bohara et al. 2006: 109). Around the same time, activities of civil society were growing as a consequence of the contribution of international development cooperation. The social base for democratic movement was particularly strong because of the continuous awareness building in Nepal's society by the NGOs and their external partners (Panday, 2007). Ironically it increased also due to the Maoist propaganda during the insurgency.

The government did little to acknowledge the rights and needs of formerly excluded and oppressed groups after 1990. So it was thanks to right-based knowledge building, social mobilization and development facilitation, that a broad range of the society was politicized and empowered to claim their rights (Panday, 2007).

After the abolition of the absolute monarchy in 1990, democratic transition was disrupted by the conflict between the government and the Maoists starting in 1996. The ensuing ten-year civil war became more intense after 9/11, when the Maoists were depicted as terrorists and the government increased the number of soldiers in the affected districts. The peace negotiations failed twice in 2001 and again in 2003. When the king took absolute power in 2006, large protest from political parties and civil society with support from the Indian government led to the demise of the authoritarian king Gyanendra. In November 2006 peace negotiations were successful and led to the promulgation of the interim constitution. This brought an end to the 10 years of armed conflict, which had claimed more than 15,000 lives

and massive violation of human rights on part of the Maoists and the State forces. Subsequently in the election 2008, the Maoists won a majority in the Constituent Assembly election (CIA, 2009). In 2008, the citizen of Nepal voted in a Constituent Assembly, named a President, elected a Prime Minister, formed a coalition government, and set about the task of writing a new Constitution by 2010. This process proved to be very challenging with ongoing political struggle between and within political parties. After a week of nationwide protests (Bandha) lead by the Maoist party starting on May 1<sup>st</sup> 2010, the Prime Minister Madhav Kumar Nepal resigned shortly after. Although his resignation could have meant an end to the political deadlock, the peace process is hampered by the ongoing political struggle between the three major parties: the Unified Communist Party of Nepal- Maoist (UCPN-M), Nepali Congress and the Communist Party of Nepal-Unified Marxist Leninist (CPN-UML). All three parties claim to be taking leadership of a new government. One of the key debates is the integration and rehabilitation of Maoist army personnel into civil society (UN Nepal, 2010). However, at the time of writing, none of the three parties have won the necessary majority to appoint the prime minister, thus the political struggle continues.

The frequent disruption in political power after the 1990s led to governmental instability, which consequently undermined economic growth and the quality of distribution of social justice (Dahal, Upreti & Subba, 2001). Almost ten years after the authors wrote this article, the political insecurity still hampers much of the development process in the country today.

### 4.3. Political division

Politically the country is divided into 14 zones and 75 districts. Each of the 75 districts has its District Development Committee (DDC) and Village Development Committees (VDCs). In Nepal there are 3913 VDCs and 58 municipalities that are further divided in smaller political units (UN, 2005). Each VDC consists of 9 wards in which one chairperson is elected, out of these 9 wards, one chairperson is elected to be the VDC secretary. Figure 4 illustrates this division and gives additional information.

Figure 4: Political division in Nepal



Source: Nepal Planning Commission (2004)

Local elections were held in 1992 and 1997 to name the secretaries at the VDC/municipality and DDC level. After their terms expired in 2002, no elections were held due to the dissolution of the parliament and the Maoist insurgency (Haug, 2008). Although the election process was frequently interrupted by the conflict, elections are taken place again since 2008. Although the Maoist-led insurgency is over, the UN (2010) reports that various political parties threaten the secretaries of VDCs. As a consequence of the ongoing pressure, numerous VDC secretaries resigned recently from their posts. This has negative impacts for people living in these VDCs, since the VDC is not only responsible for exempting birth, marriage and death certificates but should also provide basic services.

The work of the VDCs is weakened and eventually taken care of by other officials at a more central level. Thus decentralization is challenged by weak financial and human capacity but also due to threats expressed by political parties. Still, attempts to decentralization were made, especially emphasized in the interim constitution 2007. The local self-governance act (see table 9) underlines that decentralization is central to democratization.

**Table 9: Local Self-governance Act**

*‘Arrangements shall be made to set up local self governance bodies to ensure the people’s exercise of their sovereignty by creating congenial atmosphere and thereby ensuring maximum peoples’ participation in the country’s governance, and also by providing services to the people at the local level and for the institutional development of democracy, based on the principle of decentralization and devolution of power.’*

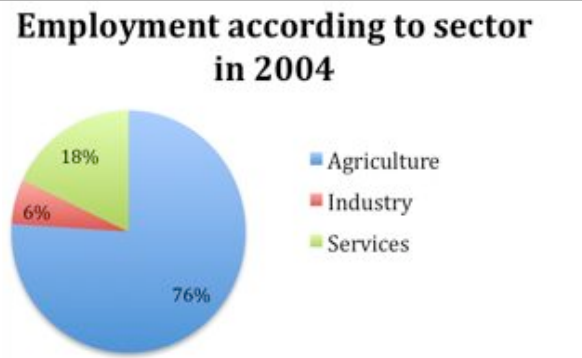
Source: Interim Constitution, Article 139, paragraph 1 (2007).

However, the next five years will be very critical to see if the transition to the new state will achieve some of the expectations raised. Regardless the composition of the new government, it faces several institutional challenges, economic and environmental problems. Claims from civil society for a more inclusive development are an additional challenge for the new government.

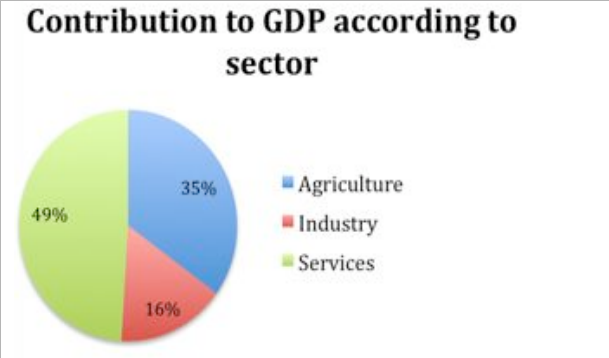
**4.4 Economic situation**

Nepal is among the poorest countries in the World, with a 46% rate of unemployment and an estimated GDP per capita of USD 470 (World Bank, 2010). Although nearly three-quarter of the population live from agriculture, which generates a third of Nepal’s GDP, 24.7% of the population live from less than USD 1 a day (CIA, 2009). Whereas industrial activity mainly involves the processing of agricultural products, Nepal’s economy relies heavily on agriculture, tourism and remittances. Figure 5 and 6 compare the main economic sectors according to employment and the relative importance of the sector to the GDP.

**Figure 5: Employment according to sector**



**Figure 6: Sector contributing to GDP**



Source: CIA (2010)

Life expectancy, with 63 years at birth, is still lower than in the neighboring countries. Most people rely on agriculture as main source of income. The population growth over the last decade has led to fragmented land holdings and depletion of forest products since more fire wood is needed, therefore the ratio of population to arable land is one of the highest worldwide (World Bank, 2010).

When the country opened its gates, in 1950s, tourism has increased especially in the 1970s but declined sharply during the years of conflict. Tourism is a very important sector for Nepal's economy. Acknowledging this, the government of Nepal wants to declare 2011 as the year of tourism, expecting a significant increase of tourists in the coming years. Besides tourism, there are many Nepalese migrant workers<sup>12</sup> in India, the Middle East and Western countries sending back remittances, which is an important source of income for many families in the country. In 2007, USD 1.7 billion in remittances was sent to Nepal (HDR, 2009). Due to the international financial crisis many migrant workers lost their jobs in the Middle East and had to return to Nepal. However, remittances have started to increase again to USD 2.8 billion in 2009 (CIA, 2010).

Foreign direct investment (FDI) has varied over the last 30 years: it increased from USD 7 million in 1996 to USD 35 million in 2004, but has declined and increased remarkable in between this period. During the years of conflict, FDI declined sharply. The greatest proportion of FDI comes from India with 37%. Although the central government wants to increase FDI especially in energy and transportation sectors, corruption, a slow bureaucracy, unfavorable bank lending policies and tax structure negatively affect investment. Additionally during the years of conflict, foreign companies were cautious to invest in Nepal (Library of Congress, 2005). As indicated before, services are a major contributor to Nepal's GDP. Official Development Assistance (ODA) generates most of the jobs in the service sector. Nepal receives between USD 350-400 million annually from international organizations such as the World Bank, the UN and mainly the Asian Development Bank. The most important bilateral donor is the Japanese government, followed by the German government and various other European and American governments (OECD, 2004).

Despite the fact that the large majority of people works in agriculture, there is not sufficient food for many people in Nepal. In 2008, due to high food prices, the number of people, who needed food assistance rose to nearly 6.4 million (UN, 2008).

Although tourism and hydropower have a great potential to contribute to the GDP, prospects for foreign trade or investment in other sectors is poor. Several reasons hamper the economic development of Nepal: the small size of the economy, its technological backwardness, its remoteness and landlocked geographic location, power shortages, its civil strife and labor unrest and highway blockades, and Nepal's vulnerability to natural disaster (CIA, 2009).

However, Nepal's economy is growing slowly and is expected to be at 3.5% in 2010, which is a remarkable improvement compared to the years during the Maoist insurgency (World Bank, 2010).

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<sup>12</sup> Data about migrant workers are inconsistent. Official numbers indicate that 20,000 Nepalese were working abroad before the financial crisis, however the actual number is much higher. Most migrant workers are not officially registered.



### 4.5. Nepalese society

Nepal is one of the few countries not being influenced by foreign powers for a relatively long time. Because of its remoteness and the lack of infrastructure, Nepal’s society is highly complex. Three major ethnic groups can be classified: Indo-Nepalese, Tibeto-Nepalese and indigenous Nepalese (UN, 2005). Besides this classification based on origin, there are more than 100 ethnic and caste groups, 91 linguistic groups, and 9 religious groups that are found today in Nepal (Haug, 2008: 4).

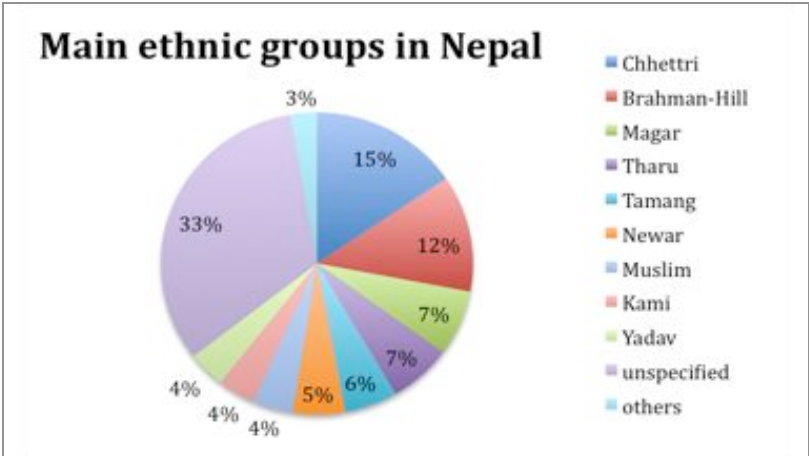
Besides the various ethnic differences in Nepal, a number of religious traditions are followed. About 80.6% of the population in Nepal belong to Hindu, 10.7% are Buddhist, 4.2% Muslim, 3.6% Kirant and around 0.9% follow other religious traditions (Nepal Census, 2001).

The caste-system regulates nearly all aspects of people’s lives and is a major reason for the huge inequality between men and women. Along with the establishment of the Civil Code in 1854, people were ranked according to their caste. Although the caste-system was officially abolished in 1963, it has still been in practice ever since.

Nowadays many NGOs raised awareness about caste-based discrimination. Additionally, equality of all people regarding their castes was also raised more publicly during the Maoist insurgency. Nevertheless women are still in a weaker position even within the Maoist<sup>13</sup> cadre (CPN-UML).

Besides the major ethnic groups, there are several sub-castes and divisions within ethnic groups. Figure 7 gives an overview of the main ethnic groups in Nepal.

Figure 7: Ethnic groups in Nepal



Source: Nepal Census (2001)

Each ethnic group has its own dialect or language. Although ethnic tensions have not been as prominent as in India or other South Asian states, various groups have formed to claim their rights publicly and to address the political and economic domination by other groups. Ethnic differences are increasingly challenging national integration and unification. A recent example is the struggle for greater autonomy of the

Terai region, led by ethnic Madhesi. Killings, abductions, death threats and roadblocks by armed men have affected the livelihoods and security of people living in the Terai (Global Security, 2008). Peace talks however are underway and Madhes-based parties expressed conditional agreement to collaborate with the current Maoist Prime Minister candidate, if their issue is taken seriously (Nepalnews, 2010). Nevertheless, not all ethnic groups have joint forces and claim their right, feudal traditions prevail in many parts of Nepal. Especially women and lower cast groups are still marginalized and gender equality is far from being realized.

<sup>13</sup> See Manshuri Thapa’s novel ‘Forget Kathmandu - an Elegy for Democracy’ published in 2006.

## 4.6. Water and sanitation in Nepal

This section will describe the current national trends related to water and sanitation in Nepal. Also there is a brief overview of the recent political attempts to improve access to water and sanitation services.

### 4.6.1. Challenges in water resource management

As mentioned earlier, Nepal is a mountainous country and largely influenced by the Monsoon starting in June until September. Although there is a constant availability of water either from precipitation during the summer months or through snow and glacier melts throughout the rest of the year, water availability is not given in all parts of the country. As in other parts of South Asia, the rising average temperature has significant impacts on the Nepal Himalayas, manifested in terms of glacier retreat and increased size and volume of glacial lakes. There is a risk of glacial lake outburst flooding, which can flood dams, agricultural land and human settlements. The continuation of glacier retreat can also reduce river flow during the dry season. Furthermore, the estimated intensification of the monsoon may also enhance variability of river flow. Therefore access to land, water and resources are challenged, threatening the existence of thousands of people. Moreover, with increasing demand for water in urban areas, water resources management becomes a major challenge at all political levels. Kathmandu Valley faces water shortages at a daily basis in the period of February until June. Moreover, since electricity is relying almost fully on hydropower, power shortages are common.

Although access to drinking water in Nepal has increased over the last decade, it is not necessarily safe drinking water that people have access to. Despite the fact that several cities have a drinking water supply network, shortage of water is a common feature due to unexpected urban growth and weak water management. In the urban area, problems occur also due to discharge of untreated wastewater into water bodies and unmanaged solid waste (UN HABITAT, 2009).

### 4.6.2. Policy responses

According to UN Habitat (2008), 76% of the population has access to drinking water facilities. Still, only one fifth in rural and one third in urban areas have access to improved sanitation facilities. The government of Nepal has given priority to improve access to drinking water and sanitation. With the formulation of the Water Resources Strategy (WECS 2002) and the preparation of the National Water Plan 2005, attempts to improve water resource management were made. The main goal of the WECS aims at the following: 'living conditions of Nepali people are significantly improved in a sustainable manner' (ADB, 2009/b). The National Water Plan, on the other hand, aims at providing basic drinking water services to 90% of the population, access to medium or high standard drinking water services to 5% of the population and basic sanitation facilities to 90% of the population by the end of 2012 (UN Habitat, 2009: 14). The Tenth Five-Year Plan/PRSP aims to supply 85% and 100% of the rural and urban population respectively with water. Although the government has realized that this provision cannot be made by central planning alone, policies to decentralize water resource management to the communities have been adopted. One example of natural resources development and management at the local level has been the introduction of Water User Group and Forest Users Group in Nepal (Pant et al., 2005).

### 4.6.3. Impacts of sanitation gap

The numbers about sanitation coverage vary according to the organization. It is estimated that only 46% of the population has access to latrines compared to 76% of the population with access to water supply. About one-third of the 75 districts have less than 20% sanitation coverage. Differences between rich and poor people are significant, 80% of the wealthy have a toilet, whereas only 12% of the poor have access to sanitation (UN, 2009/b). UN Habitat mentions that 37% of urban households, and 20% of rural households are using improved latrines (UN Habitat, 2009: 10). Lack of sanitation at schools is about a third and only one-fourth of the schools provide separate facilities for girls and boys (UN, 2009/b).

For many people living in rural areas, open-air defecation is a common practice. This habit has severe consequences for health of individuals but can also contaminate common used water bodies. Contaminated water bodies put public health at risk. It is estimated that about 30,000 adults and 45,000 children under age of 5 years die annually due to diarrheal diseases (Pokhrel & Viraraghavan, 2004: 72; Ansari et al., 2009: 235). By establishing sanitation facilities, the main objective of safe defecation is to avoid fecal-oral transmission and to prevent waterborne diseases like diarrhea (Avvannavar & Mani, 2007: 2), which has a clear positive impact on children's health, with additional increases in the weights and heights of children (Esrey, 1996: 608).

Overall factors such as illiteracy, traditional perceptions of causes for diarrhea and poverty have increased the risk of waterborne diseases. Therefore the key challenge to improve sanitation is to assure that the poor and marginalized people in urban dwellings and/or remote areas have access to drinking water and construct, use and maintain their own latrines.

## 4.7. Main actors in water and sanitation sector

In order to implement sanitation facilities, several agencies have adopted various approaches. Two of them are relevant for this study and will be shortly described.

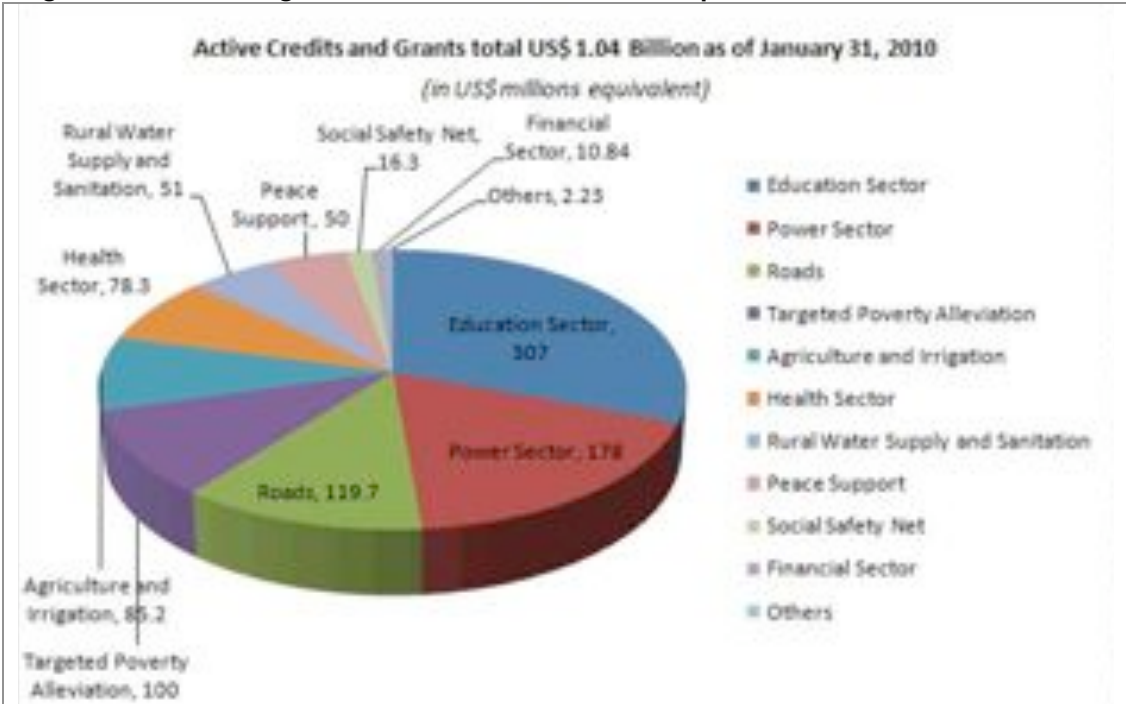
### 4.7.1. World Bank

The World Bank has assisted Nepal in its development with analytical work and funding. Poverty reduction is the main objective of the World Bank's activities, therefore a variety of sectors responsible for infrastructure are supported. The World Bank does not implement its own projects, rather it provides advice and funds for projects planned and implemented by Nepalese organizations.

The World Bank supports the government of Nepal in its attempts to improve access to drinking water and sanitation. Similarly, figure 8 shows to what extent the World Bank supports various sectors.

The World Bank financed Rural Water Supply and Sanitation Fund Development Board implements WatSan projects in rural areas, where people traditionally lack access to drinking water and sanitation. The Fund Board projects are empowering communities to take responsibility in constructing and maintaining this infrastructure to improve their quality of life. Also, the projects aim at improving access to income generating activities and community infrastructure for those who have been formerly excluded by reasons of gender, ethnicity and caste, as well as for the poorest members in a community (World Bank, 2010).

**Figure 8: Credit and grant from the World Bank for Nepal**



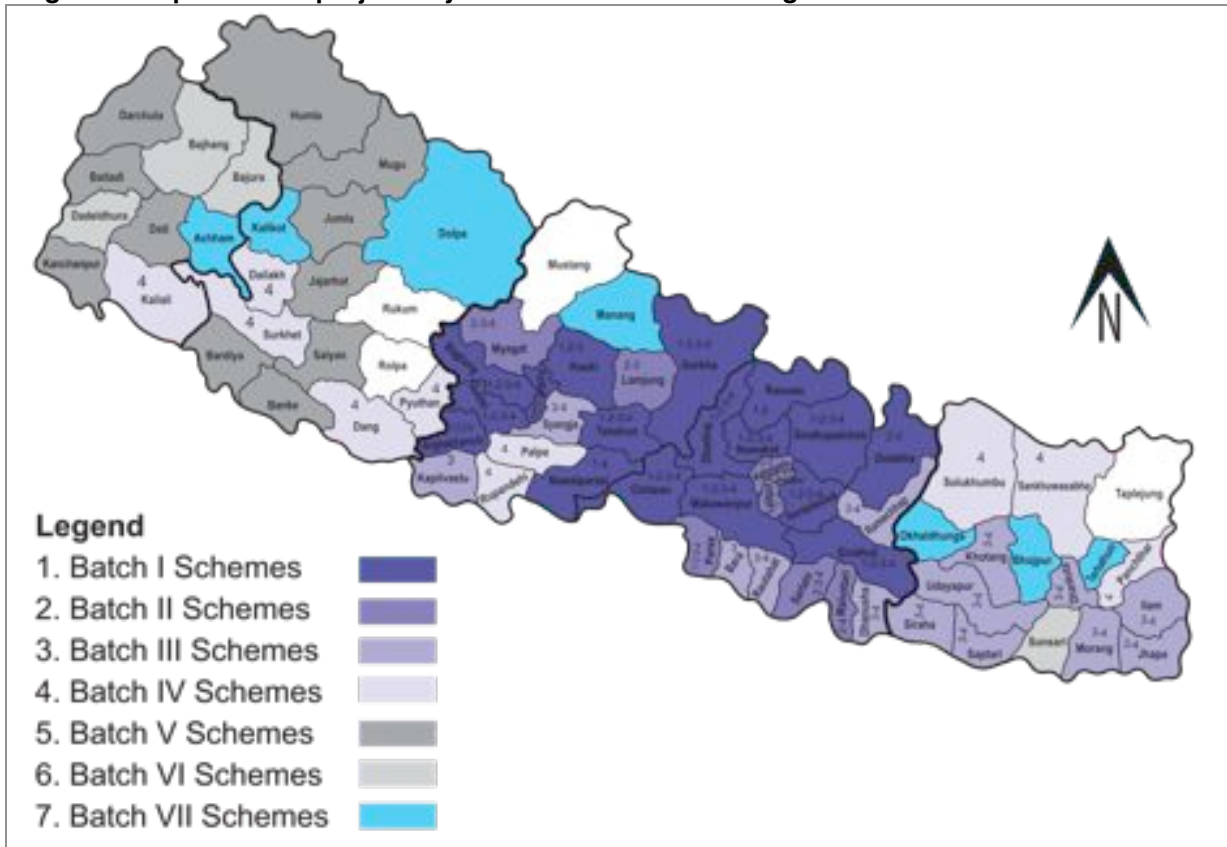
Source: World Bank (2010)

**4.7.2. The Demand Driven and Participatory Approach of Fund Board**

The Nepalese government established the Rural Water Supply and Sanitation Fund Board in 1996. The Fund Board promotes sustainable and cost effective demand-led rural water supply and sanitation services in the country. The program marked a shift from the conventional supply-oriented approach towards a more demand driven and participatory approach. Since its establishment, there have been two main project phases, the first from 1996-2003 (Batch 1-4) and the second from 2004-2009 (Batch 5-7), implementing more than 1300 schemes in almost all districts of Nepal (see figure 9). The World Bank (IDA), the Nepalese Government and communities fund activities and projects of the Fund Board. As the name states, the Fund Board does not implement the projects itself, but provides funding and training for local organizations implementing their projects. These so-called support organizations (SOs) include national or international non-governmental organizations, the private sector and community-based organizations. The SOs are working on 1-5 Fund Board project/s per batch, improving water and sanitation in rural communities with less than 1000 inhabitants. The Fund Board hires approximately 200 different SOs implementing 400 projects in one batch.

Figure 9 depicts all districts of Nepal and the coverage of Fund Board projects. The different colors show in which batch one or multiple projects were implemented in the respective district. Initially projects were carried out near the capital but extended to all but 4 districts in the entire country.

**Figure 9: Implemented projects by the Fund Board according to district 1996-2009**



Batch I- IV delivered WatSan to 0.6 million people between 1996-2003  
 Batch V-VII delivered WatSan to 0.8 million people between 2004-2009

Source: Fund Board (2009)

The main goal is to mobilize the community to set up their own specific water and sanitation scheme. The Fund Board approach consists of four main phases: the pre-development phase, the development phase, the implementation phase and post-implementation phase. Table 10 provides more detailed information about the different phases according to the Fund Board modality.

**Table 10: Different project phases of the Fund Board**

During the **pre-development phase**, the main objective is to select SOs and schemes that meet the Fund Board criteria. The SO submits the pre-feasibility study of schemes to the Fund Board in collaboration with communities and consults with VDC and DDC. After the Fund Board reviews and approves the pre-feasibility study, the SO submits a proposal for community activities. This forms the basis for the development phase contracts between the Fund Board and the SO. At the same time, the SO is required to inform and consult the VDC and DDC about the project details.

The **development phase** lasts also a year and the first payment is made to the SO covering for the pre-feasibility study and further community development activities. Also the SO staff is trained, the community prepared and contracts between the three parties are finalized. The community is asked to draft Community Action Plans, which are the basis for activities during the implementation phase. The community members select WSUC members, register them legally, open a bank account, collect money for the upfront cash and start to construct household latrines. During this period, community members are building up institutional capacity. As a consequence, only those communities willing and motivated to participate are submitting their proposals.

The **implementation phase** then lasts 10-13 months and the actual water supply system is constructed including the construction of institutional latrines. The main goal of this phase is to consolidate and complete a functioning water supply and sanitation scheme and to train WSUCs and community members in operating and maintaining the scheme. Separate payments in different installments are made, one for community development activities to the SO, the other to the joint account community and SO for the construction costs. These payments are only made, if the SO and community keep up with specific tasks under the contracts, which are assessed by the Service Agency (SA)<sup>14</sup>.

The **post-implementation phase** lasts for 2 years and is characterized by strengthening the capacity of community members to maintain the system. Although the community members take responsibility of operation and maintenance themselves, the SO links with local government as well. The SO is visiting the community quarterly and assists them with technical support.

Source: Fund Board, 2010

#### 4.7.3. Other approaches in the water and sanitation sector in Nepal

Besides the Fund Board and its SOs, numerous organizations in the water and sanitation sector<sup>15</sup> are active in Nepal. There are numerous of other INGOs and NGOs that are not listed in figure 10 but play an important role in improving WatSan coverage throughout Nepal as well. To illustrate how these INGOs, NGOs are operating, figure 10 shows that the organizations, based mainly in Kathmandu, are funding other NGOs located in different districts to implement their program in the communities or in cooperation with schools, VDC, and/or DDC. Also the NGOs at the local level can work for several national organizations at the same time, such as ENPHO, Nepal Red Cross Society, Lumanti and others. These local NGOs can additionally have their own projects without being paid by the national organizations but in collaboration with local and regional government bodies for example.

A broad classification distinguishes between organizations mainly focused on urban and peri-urban areas in the water and sanitation sector (ADB, UN Habitat, Water Aid etc), and others, which are specialized to improve WatSan services in rural communities (Fund Board, DoLIDAR, UNICEF, NRCS etc.). The government of Nepal classifies rural communities of having less than 1000 inhabitants. These are targeted by DoLIDAR and the DWSS targets those communities with more than 1000 inhabitants, which are considered urban.

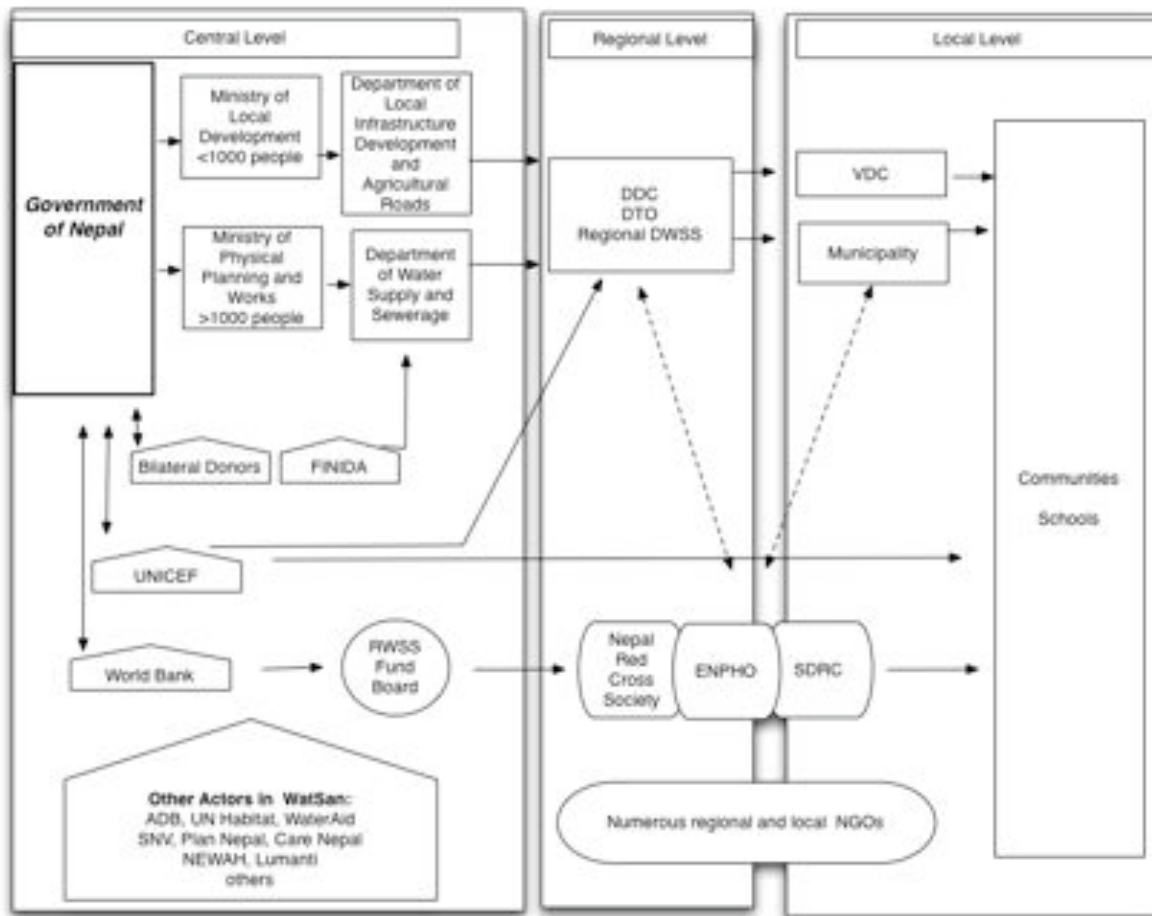
However, not all organizations are following this division, and programs of the CLTS, SLTS for example are also carried out in communities with more than 1000 inhabitants. For the Fund Board and DoLIDAR, DWSS respectively, this distinction is a guiding principle for their programs.

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<sup>14</sup> Service Agencies are NGOs hired to evaluate the community and SO's progress. The SA usually check progress at the end of each phase for about 2-4 months. During this time, the SO does not carry out any community activity. To enhance transparency and compliance, the Fund Board adopted this evaluation mechanism.

<sup>15</sup> Implementing water supply and sanitation differs a lot between the rural and urban context and numerous socio-economic, environmental, institutional differences emerge, making a meaningful comparison between urban and rural WatSan projects notably difficult. Therefore only two approaches relevant in the rural context are mentioned (SLTS and CLTS).

**Figure 10: Institutional set up in water and sanitation sector in Nepal**



There are two approaches focusing on community mobilization that are widely used in Nepal and supported by the government. Because of their importance, they are briefly described subsequently.

Two approaches known as Community Led Total Sanitation (CLTS) and School Led Total Sanitation (SLTS) are prominently used to declare open defecation free areas (ODF). The government of Nepal works together with the Finnish Development Agency (FINIDA) to declare VDCs and DDCs as ODF. ODF means that people are using toilets instead of the riverbank, forest or fields for defecation. It is possible that feces lying around are transferred through shoes, clothes or skin contact and at some point will end on people's hands. Because the majority in Nepal eats with their hands, it is possible that small amounts of feces are ingested while eating. Also, communal water points are easily contaminated through buckets, bowls or other vessels, which are not cleaned beforehand. Moreover, there are many flies attracted to human feces, which potentially land on people's food at some point. The CLTS program aims at stopping people from defecating in the open. The program encourages (or forces) people to construct simple pit latrines or any other type of toilet. To diminish the risk of contamination of water bodies, those feces still lying around are covered with leaves or organic waste.

CLTS stresses the fact that if only a few people continue to practice open defecation, the health of the entire village is affected. Through the CLTS program community members are supported to conduct their own appraisal and analysis of their sanitation state and motivated to take action to declare their village as open defecation free. Upon declaring ODF, the community receives a small financial reward (CLTS, 2008). At a later stage, the entire VDC

and DDC should be declared as ODF. This program was adopted after realizing that merely providing toilets and subsidies for hardware does not guarantee their use.

Similarly to the CLTS, UNICEF has modified the approach to focus on schools as the main trigger for behavior change. The School Led Total Sanitation (SLTS) is convinced about the role of the school as the most persistent institutions within a village, assuming that students and teachers are the most effective triggers to convince the community members to eliminate open defecation. Similarly to the Fund Board, UNICEF hires local/regional NGOs to carry out the SLTS program in various communities. The NGO trains teachers about the approach and methods available to eliminate open defecation and to support behavior change among community members. After this training, teachers educate their students about health and hygiene issues combined with tools to eliminate open defecation.

Within the SLTS approach, students are seen as nodes to stimulate their families, neighbors and relatives to eliminate open defecation (CLTS, 2008). Depending on the implementing NGO, subsidies (hardware or cash) are occasionally provided to support the construction of toilets. Some NGOs however use a no-subsidy policy and encourage community members to build temporary latrines, which are assumed to be up-graded once the people get used to have access to a private toilet.

There are other approaches used to increase toilet coverage and improve access to water supply, however they are less relevant for this study compared to the two mentioned above.

#### 4.8. Regional context: Tanahun and Chitwan District

The Fund Board recommended visiting projects in districts near Kathmandu. Tanahun and Chitwan<sup>16</sup> district are both relatively easy accessible by transport and represent two different habitats, one in the hilly areas and one in the low-lands of the Terai. The Terai is the most urbanized and densely populated area in Nepal. At the same time, a large number of people in Nepal are living in the hilly areas as well. Therefore both districts are representing areas where a majority of Nepalese people lives.

The Chitwan District is part of the Narayani Zone in the Central Development Region. Its humid climate, malarial swamps and its fertile land characterize the Terai region. Due to widespread malaria, very few people could survive in this climate. Originally the few inhabitants of Chitwan Valley were small communities of Tharu villagers, who were lucky to be resistant to malaria. In the mid 1950s, after eradicating malaria in some parts of the Terai, many peasants from the hills migrated into the area in search for arable land. Additionally, after completion of East-West and North-South highways, many urban centers began developing rapidly. The Chitwan district is characterized by rapid population growth, high urbanization rate, considerable changes in land use and increased pressure on agricultural land (Agergaard, 1999). Around half a million people are living in Chitwan district only. Chitwan is widely known for its national park, home to elephants, rhinos, tigers and bears, attracting many thousand tourists every year. Occasionally, wild animals also attack locals outside the park, when they are going to the jungle for defecation.

The Terai region is very humid in its climate but at the same time people suffer from decreasing availability of water. This is especially challenged by increased extraction of groundwater by deep wells and during the dry months before monsoon (April-June) when the groundwater table decreases. Additionally high arsenic contamination of water is common,

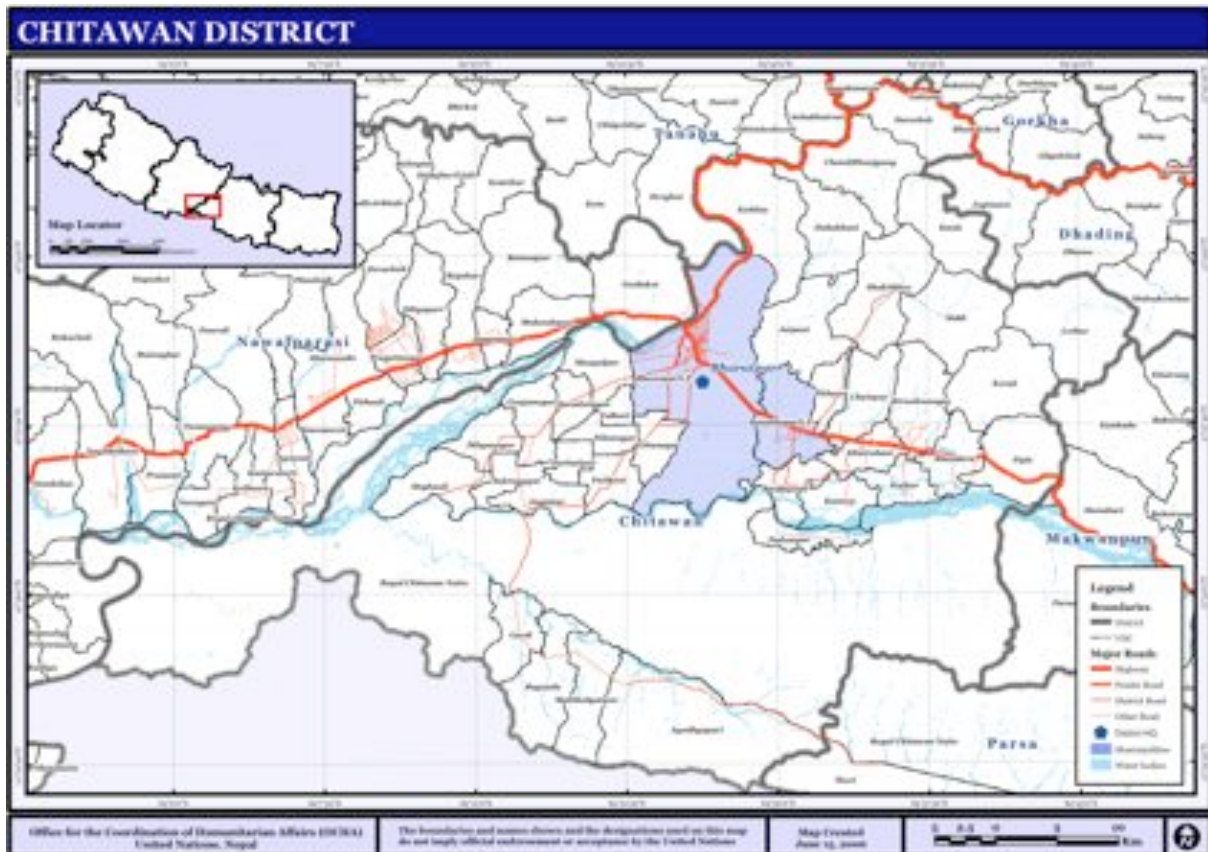
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<sup>16</sup> Chitwan can also be written as Chitawan. Similarly Tanahun can also be written Tanahun.



articulated by the use of deep tube well. High amount of arsenic in drinking water can cause cancer and cardiovascular diseases. Most people living in rural areas in the Chitwan district, are using water from a river or a well, which is often contaminated by human activities (livestock, farming, waste water). Few people are treating water before drinking, thus many suffer from water borne diseases such as diarrhea.

**Map 2: Chitwan District**



Source: United Nations (2006)

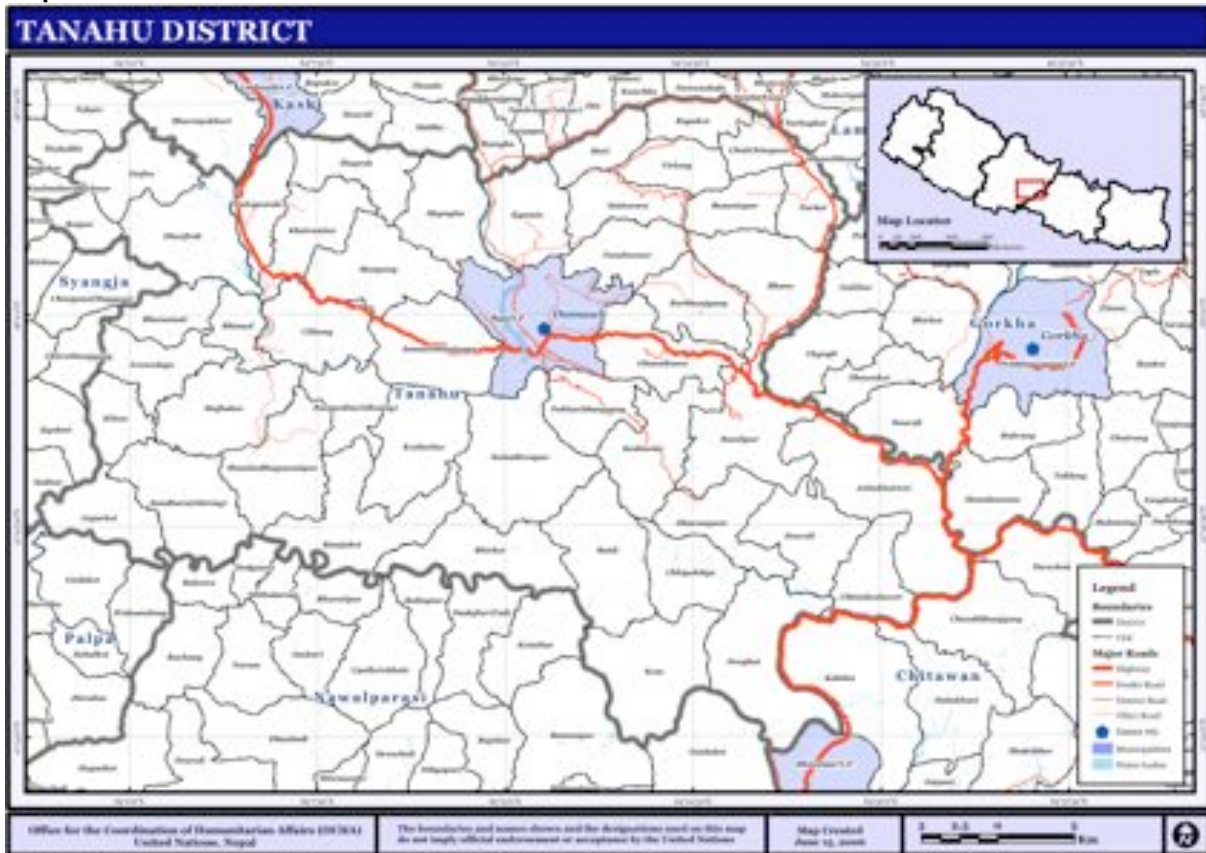
Water and sanitation coverage is improved through numerous NGOs working in Chitwan district. The officials at the DDC office were familiar with NGOs (and INGOs) such as NEWAH, NRCS, SDRC/Fund Board and UN Habitat, but not with other NGOs also implementing WatSan projects in their district. Although there is an annual district council where all stakeholders in WatSan should gather, these meetings are not held regularly. Also, there is no district WASH plan that should coordinate different stakeholders in the district. At the time visiting, there were no attempts to set up a district WASH plan at the DDC. Besides efforts of the DDC to improve WatSan coverage, many people still lack access to safe drinking water and do not have their own toilets.

The second district chosen for this study is Tanahun, which is in the Western region of Nepal, on the main road to Pokhara (Kaski district). The Tanahun district lies in the hilly area on 340-2325m altitudes and is characterized by subtropical climate (Pant et al., 2005: 27). It is not widely known to be a tourist destination, yet since tourism is diversifying and offers many adventure sports, the main entry point to do river rafting is close to the district capital Damauli. Hence, the city might get its share of tourism in the future.

Compared to the Tarai region, the hilly areas are less populated and sizes of households are usually smaller. Many people migrate to urban centers like Bandipur or Damauli in order to find employment and make a living. Agricultural land is scattered in the hills and therefore challenging to work with. Another characteristic of hilly areas is that many different ethnic

groups are living within one community.

### Map 3: Tanahun District



Source: United Nations (2006)

Regarding water and sanitation coverage, many NGOs are working in the Tanahun district. Still, as in other districts, coordination with stakeholders in the WatSan sector is challenging. Although Tanahun DDC holds regular annual district councils, not all NGOs are attending these meetings. Still, a first attempt to improve coordination was done by the DDC secretary at the very same day when visited. The WatSan co-ordinator of the DDC signed an agreement in May 2010 in order to improve coordination with six different NGOs and the Department of Water Supply and Sanitation in Western Nepal, the government of Nepal and FINIDA. All of them will improve access to WatSan in six selected VDCs. The experiences made in these six VDCs will provide relevant information for drafting the district WASH plan. The DDC WASH plan should set guidelines for other WatSan related NGOs working in the Tanahun district.

Compared to the Chitwan district, access to water via river or spring source is less problematic in the Tanahun district. Also arsenic contamination of water is less pronounced than in the Terai. Still, elevation differences impact the collection of water. Table 11 contains key information about the two districts.

**Table 11: Basic information about Chitwan and Tanahun District**

	<b>Chitwan</b>	<b>Tanahun</b>
Area	2218 km <sup>2</sup>	1546 km <sup>2</sup>
Inhabitants (in 2001)	472,048	315,237
Number of VDC	42	36
Number of municipalities, sub-metropolitan area	2	3
Annual funds for WatSan (2010) at DDC level	Rs. 4,900,000	Rs. 7,200,000
Percentage of funds to WatSan	28.5% sanitation 71.5% water supply	20% sanitation 80% water supply
Year to declare ODF	2010	2012

Source: Nepal census (2001) and interviews with DDC secretary (2010).

The two districts selected for this research have both made impressive progress to improve water supply and sanitation coverage. The Chitwan and Tanahun district are said to be leading districts in WatSan sector throughout Nepal. Both districts have ambitious targets for the coming years: Chitwan district wants to end open defecation at the end of 2010. Similarly Tanahun district will declare the entire district as ODF in 2012.

#### 4.9. Local context

The implementing NGOs, National Red Cross Society and Social Development and Research Center, recommended seeing six different villages, of which three were finally selected for this study. This section briefly describes the state of water and sanitation for the entire VDC and gives more detailed information about each community.

Table 12 gives a first overview about the three communities on the VDC/municipality level.

**Table 12: Comparing state of water and sanitation between three VDCs**

	<b>Birendra Nagar VDC</b>	<b>Byas municipality</b>	<b>Pithuwa VDC</b>
Annual funds for WatSan in Rs	100,000-200,000	4,730,000 including solid waste (5.03% of overall budget)	1,000,000 (20-25% of overall budget)
NGOs in wards	Rural Reconstruction Nepal SDRC /Fund Board British Welfare Pokhara others <sup>17</sup>	Pharak Chaur Sewa Samaj Tanahun Sewa Saj NRCS/ Fund Board DEA NEWAH Damauli Water and sanitation society	UNICEF Fund Board
Declaring ODF	All schools have declared ODF already but VDC did not yet	2012 along with Tanahun district	June, 2010

Source: Interviews with VDC secretary (2010)

In respect to the three selected communities, there are differences in the size of their settlement, the composition of ethnic groups and the size of the water supply system. For a first overview, table 13 makes a comparison at the community level.

<sup>17</sup> There were more NGOs working on WatSan projects but the VDC secretary does not keep track of their activities.

**Table 13: Basic information according to three communities**

	Sital Tole	Chintutar	Madhavpur second
Number of households	70	92	156
Inhabitants	406	538	912
Population growth rate	2.86%	1.62%	2.86%
Number of Dalit households	28 (40%)	10 (10.9%)	22 (14.1%)
Number of marginalized land owners	30	-	-
Number of public taps	10	15	22
Implemented in Batch	6	6	7

Source: Final report from SDRC and NRCS (2009/2010)

The next section will describe the WatSan situation in the three communities. In order to understand the circumstances, a brief summary of the WatSan state is given about the entire VDC, followed by detailed information about the communities.

#### 4.9.1. Community 1: Sital Tole in Birendra Nagar VDC

**Table 14: Information about Birendra Nagar VDC**

Birendra Nagar VDC			
Inhabitants	School enrollment	Illiterate Male	Illiterate Female
13,270	65%	82.8%	65.5%

Source: Nepal Census (2001)

Birendra Nagar VDC is about 20-25 km next to the district capital Bharatpur. Most people in Birendra Nagar VDC<sup>18</sup> are living from subsistence agriculture. The wards in the community are connected by dirt road, however local transport is limited. Thus the most convenient vehicles for

transportation are bicycles. Additional information about the VDC is summarized in table 14. Regarding water and sanitation, there are at least three NGOs working in this VDC. However, only three out of nine wards receive support from NGOs. People in the remaining wards are using groundwater from wells. Two wards are having access to groundwater of good quality. However, in three other wards water is only available for two hours a day. Additionally, one ward suffers from high water scarcity throughout the year. So overall, a majority of people living in Birendra Nagar VDC relies on water of insufficient quality fetched from communal wells.

The community living in Ward 8 received support from SDRC to improve water and sanitation and the project ended in 2008. Sital Tole is the smallest of the three communities included during this study.

The houses in the community are situated in front of a hill, which is covered by forest. Sital Tole is accessible by dirt road but not connected via public transport. The different houses are relatively close to each other but not all are connected by road.

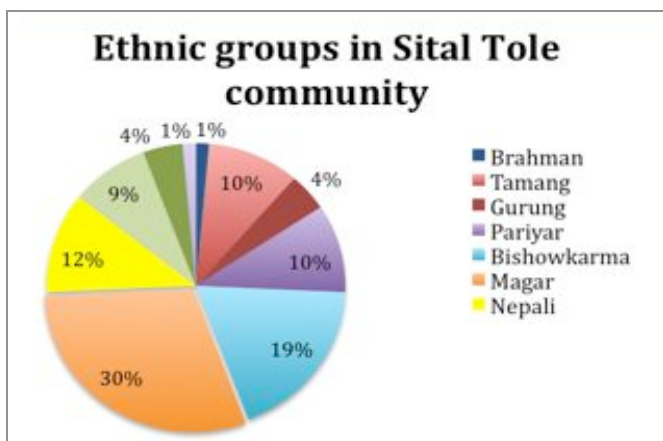
18 There is only very limited data available for Sital Tole, therefore information is given for the entire VDC.

**Map 4: Schematic map water supply system in Sital Tole**



Source: Own observation, adapted by Dario Buddeke (2010)

**Figure 11: Ethnic groups in Sital Tole**



Source: Final report SDRC (2009)

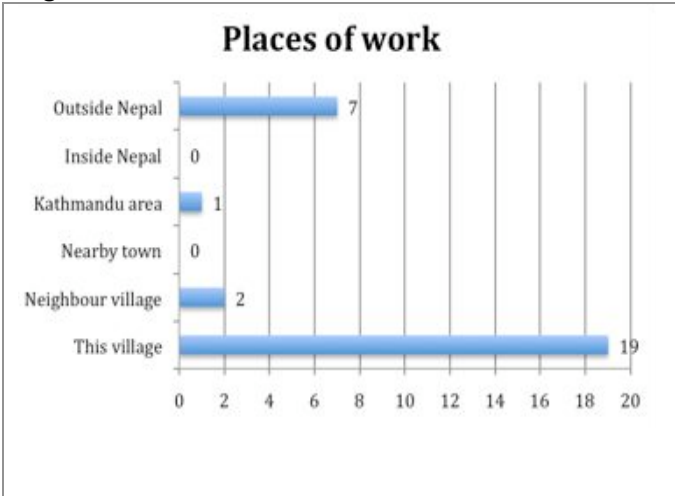
Although Sital Tole consists of only 72 households, it is a community with several indigenous groups such as Pariyar, Bishowkarma and Nepali<sup>19</sup>. More than a third of all inhabitants belong to the Dalit community. Compared to other settlements the number of Dalits is high in Sital Tole. Figure 11 illustrates these findings.

<sup>19</sup> These groups are sub-groups within certain casts.

Similarly to the findings for the entire VDC, SDRC assumed that most people in the community are illiterate. Therefore receiving information about a project like Fund Board was only possible by word to mouth.

About two-thirds of the people interviewed are still working as farmers or are living from raising livestock. Few people are working outside the village (see figure 12). Additionally, only four respondents receive remittances, which is an important part for their income. Table 15 compares the different sources of income and their importance for the households. As depicted in the figure, farming is the most important income source for many households in Sital Tole, especially for the poorest. Although most people work in agriculture, almost half of all households (30) are without access to land or are marginal landowners<sup>20</sup>.

**Figure 12: Places of work in Sital Tole**



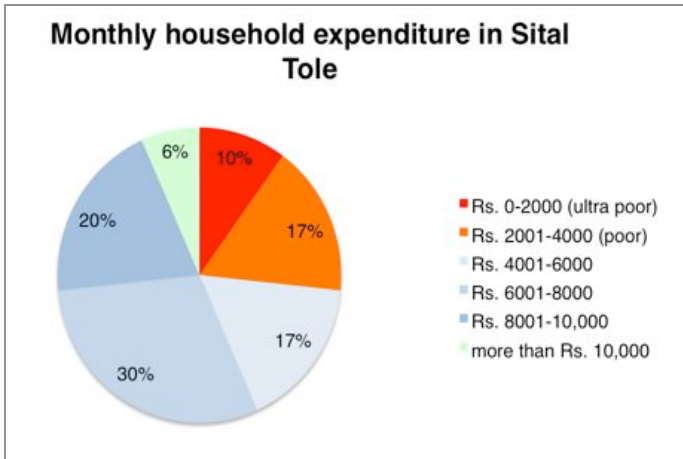
**Table 15: Type of work in Sital Tole**

Type of Income	Most important	Second most important
Farming	19 (63.3%)	7 (23.3%)
Livestock raising	4 (13.3%)	15 (50%)
Own business		
Job	2 (6.7%)	3 (10%)
Foreign employment		1 (3.3%)
Wages	2 (6.7%)	
Remittances	3 (10%)	1 (3.3%)
Pension, other support		1 (3.3%)

Source: Household Survey (2010)

Since most respondents work in subsistent agriculture and lack access to local markets, few products can be sold. Because regular income is lacking for most households, especially the poorer ones, monthly expenditure is low (see figure 13).

**Figure 13: Expenditure in Sital Tole**



Overall three households interviewed belong to the ultra poor and five households belong to the poor. Monthly expenditures varies greatly in Sital Tole, although differences are not as much articulated as in Madhavpur, the socio-economic variation between respondents vary greatly.

Source: Household Survey (2010)

<sup>20</sup> Data derived from final report of SDRC.

Besides the large socio-economic differences, the construction materials of houses do not differ largely within the community. Constructed with local materials such as mud, clay, bamboo, stones and wood, most houses have only one floor. Because most houses have thatch roof with clay walls, few can be classified permanent. As Sital Tole is not easy accessible by transport and has very rural characteristics, it is not surprising that immigration to Sital Tole is very low. All but two respondents have lived in the village for more than five years, so immigration is not a key issue in this community. However, in contrast to emigration, three respondents have one member working outside the community and seven respondents have one member working abroad. Although one would expect remittances being sent back, only four respondents mentioned it as important part of their income.

Regarding the state of water and sanitation, the situation before the project was challenging. Community members had to walk long distance to fetch water from the nearby river, which was also used by other wards. The amount of water was not sufficient and of poor quality. It was reported by the SDRC that one household member had to fetch water several hours every day. The state of sanitation was even more compelling: Before the project was carried out, only three permanent toilets were already in place, the other community members used the forest as a toilet. Nevertheless, Sital Tole was declared ODF after the primary school encouraged the community to construct toilets. The teachers were trying to do health and hygiene training beforehand, but it did not have significant effects on people’s behavior in the community. However, after requesting support from VDC and UNICEF the teachers received more training and went through the SLTS program. This proved more successful, additionally the neighboring wards were then declared ODF. Because there has not been any formal field study carried out to verify full toilet coverage, Birendra Nagar VDC has not been declared ODF yet.

In Sital Tole, there were more female members (5) in the WSUC than male (4), which is remarkable regarding the patriarchic hierarchy in most communities in Nepal.

**4.9.2. Community 2: Chintutar in Byas municipality**

**Table 16: Information about Byas municipality**

Byas Municipality			
Inhabitants	School enrollment	Illiterate Male	Illiterate Female
28,000	74.2%	84.8%	67.6%

Source: Nepal Census (2001)

The second community visited is part of the Byas<sup>21</sup> municipality, which is close to Damauli the capital of Tanahun District.

Despite the fact that Byas municipality has more funds available for WatSan projects than Birendra Nagar and Pithuwa VDC, it is

remarkable that toilet coverage is only at 50% so far. However, the current state of water access is better than for sanitation. Drinking water coverage is at 75% in the municipality and half of all communities have access to water of good quality. The remaining half has access to water of sufficient quality<sup>22</sup>.

The settlement of Chintutar is part of Ward number 6 and located next to the Seti river. The community is not directly accessible by road but within 20 minutes walking. The settlement<sup>23</sup>

<sup>21</sup> Also called Vyas municipality, depending on the source.

<sup>22</sup> Information provided by the VDC, secretary, 2010

<sup>23</sup> Besides the project area on the map, there were 20-30 households further up the hill on the right corner of the map, which are not part of the Fund Board project. The water sources used are too low in elevation to serve these 20-30 households as well. However it is not entirely clear why these households were excluded from the project,

stretches out over a large area with clusters of houses. There is a small primary school with grade 1-5 in the center of the village.

As seen on map 5, there are two different sources delivering water to fifteen taps overall. The larger source (source 1) is serving the school and thirteen public taps mostly used by the Darai community, whereas source 2 serves only two public taps. In close proximity to the source 1 used to be the former community well, which is still used by some community members. However, most community members did not have sufficient water before the project was completed. Also the quality of water from the river or the well was not sufficient for drinking, since many use the river as dumping ground and for defecation. Similarly to other villages, few people are treating water before drinking after project completion.

**Map 5: Schematic map of water supply system in Chintutar**

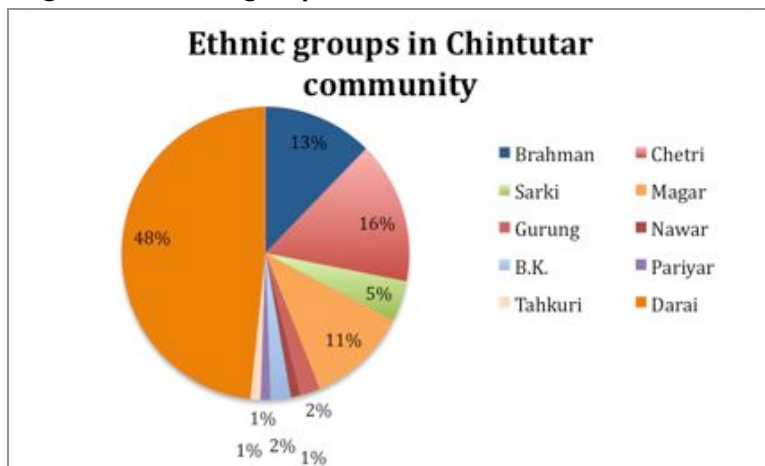


Source: Own observation, adapted by Dario Buddeke (2010)

maybe because of its unreasonable distance to the sources or because these community members were not interested about the project.



**Figure 14: Ethnic groups in Chintutar**



Source: Final report NRCS (2009)

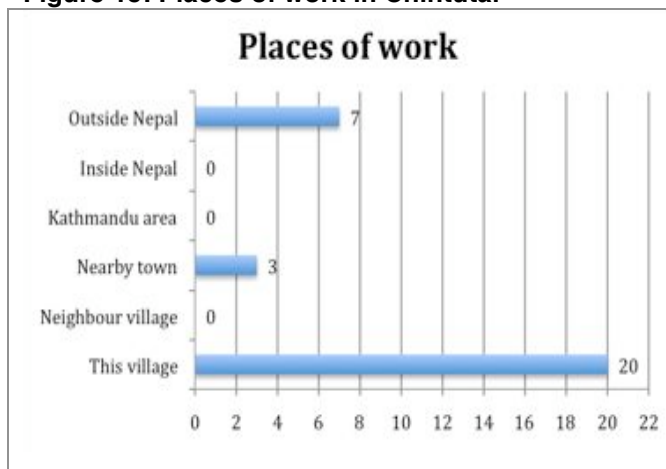
As mentioned earlier, Chintutar community is home to different ethnicities. Numerous community members belong to the Darai community, as seen in figure 14. Their houses are close to each other and Darai people speak another language and follow their own traditions, which are different from the remaining community members. Darai people are generally less educated and wealthy than others in Chintutar. Before the project was carried out, some

members of the Darai community used to feed their pigs with black water. This practice ended after receiving health and hygiene training through the Fund Board project.

Although the settlement has many rural features (size of settlement, occupation, lack of road access, construction of houses, lack of shops or health post etc.) it is classified as urban area. As compared to Sital Tole, community members are working as farmers on their land and raise cattle as seen in figure 15. Three households are classified ultra poor and nine belong to the poor group. Seven respondents have a household member working abroad, however, remittances are not an important part of people’s income.

Because of its relative easy access to the next town, five respondents have been living less than 5 years in their house. The WSUC members mentioned that many young people left the in order to find employment in a city or abroad and do not return to the community. Despite the relatively easy access to neighboring towns like Damauli or Bandipur, only three respondents have a household member working in these urban centers. It is unknown to what extent remittances are sent back from family members working outside Chintutar and why remittances do not matter much for people’s income. Most people are subsistence farmers (see table 17) with little additional income available.

**Figure 15: Places of work in Chintutar**

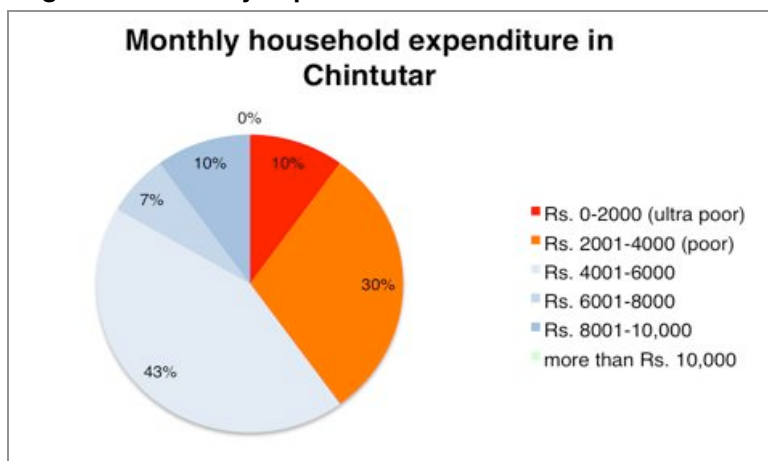


Source: Household Survey (2010)

**Table 17: Type of work in Chintutar**

Type of Income	Most important	Second most important
Farming	21 (70%)	5 (16.7%)
Livestock raring		14 (46.7%)
Own business		
Job	3 (10%)	
Foreign employment		
Wages	4 (13.3%)	2 (6.7%)
Remittances		
Pension, other support		

**Figure 16: Monthly expenditure in Chintutar**



Source: Household survey (2010)

Compared to Sital Tole, the community seems wealthier in the first place. However, as seen in figure 16, the socio-economic variation of respondents is less pronounced as in Sital Tole. Many respondents have a comparatively low monthly expenditure. There were remarkable differences in the way the houses were constructed. Especially members from the Darai community had houses made of mud, bamboo

and wood. In contrast, other houses had two floors, were made of concrete, wood and a tile roof. People living in these houses were far wealthier and had a more extensive social network outside the Chintutar community.

Regarding state of sanitation before the Fund Board project was carried out, there were only few toilets to begin with. Since toilet coverage increased remarkably during the project, the community was able to declare ODF already. However the Byas municipality has not declared ODF yet and will do so along with the district in 2012.

#### 4.9.3. Community 3: Madhavpur second in Pithuwa VDC

The most accessible community is Madhavpur second, which is part of the Pithuwa VDC, about 15 km east from Bharatpur. The community is accessible by public transport. Although Madhavpur second is considered to be a rural settlement, it has many urban characteristics such as the size of the settlement, the size of the school with approximately 500 students, access to public transport but also the nearby market which offers a variety of clothes, food, gifts, mechanic services and other services. Despite the size and relative wealth for a rural settlement, Madhavpur second is not considered urban. Still, compared to the communities in Chintutar and Sital Tole, it is the most urbanized rural community visited.

**Table 18: Information about Pithuwa VDC**

Pithuwa VDC			
Inhabitants	School enrollment	Illiterate Male	Illiterate Female
10,590	69.9%	86.2%	64.5%

Source: Nepal Census (2001)

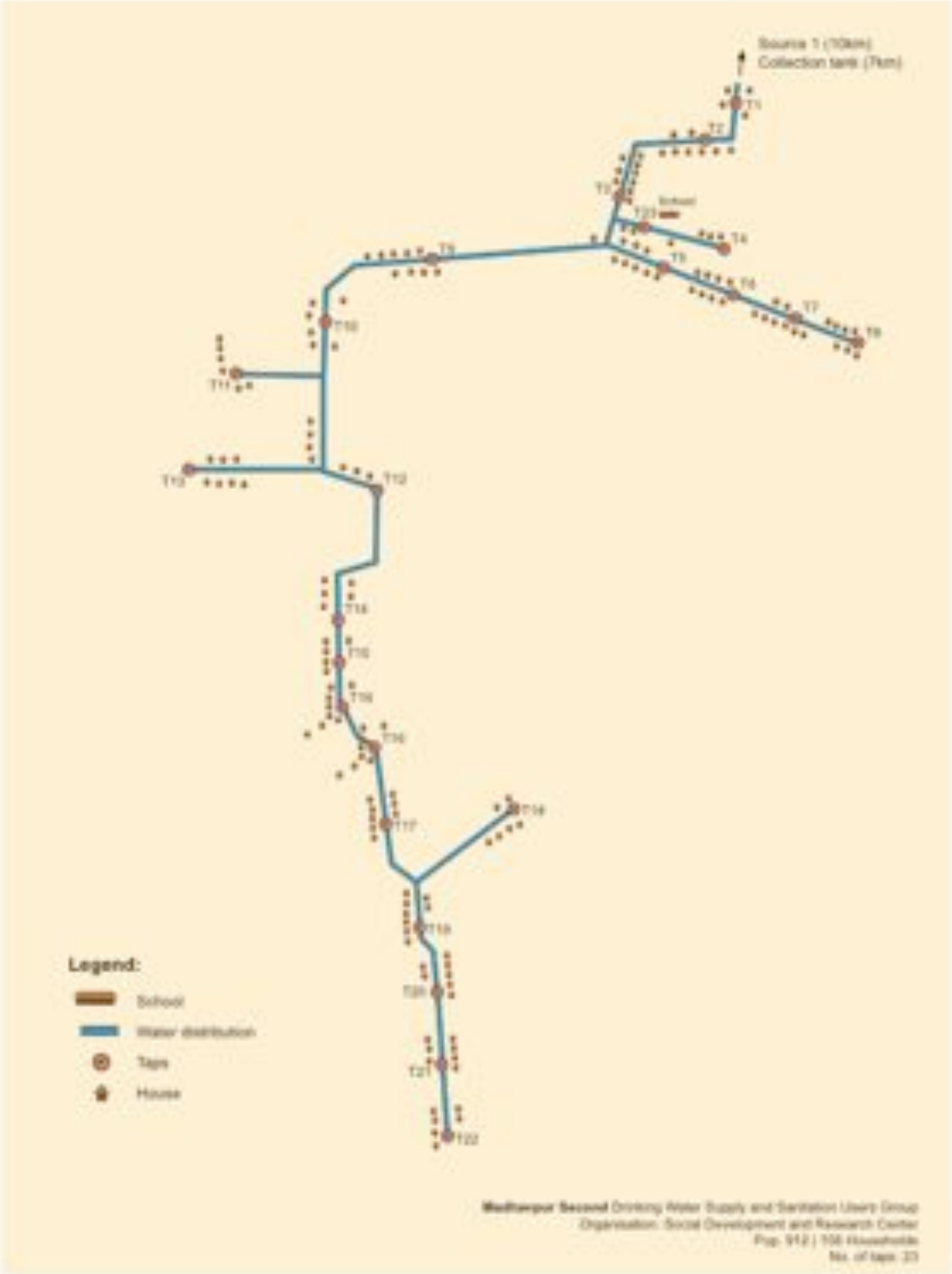
Pithuwa VDC has the lowest number of inhabitants. Compared to the national average, Pithuwa VDC along with Chintutar and Sital Tole, has a relatively high literacy rate (see table 18). Access to roads and urban areas are one of many reasons why the VDC is more developed than other areas

in the country. However, water and sanitation in Pithuwa VDC is problematic. The VDC secretary in Pithuwa explained that only two organizations are active in their VDC. The Fund Board implemented projects in four wards. In addition, UNICEF along with the VDC supports the construction of wells in other wards. Nevertheless, four wards receive no support from any NGOs. People in these wards have to rely on poor quality water fetched from a common well. Before the project was implemented in Madhavpur (first and second), community members in Madhavpur were using water from a common well (poor water quality). Water scarcity in the entire Pithuwa VDC is severe, especially during the months before monsoon.

The community in Madhavpur second is the largest project site of the three selected schemes, including more than 900 inhabitants. Madhavpur first and second consists of two community clusters (each around 800-900 inhabitants) and both received support from the Fund Board. To meet the Fund Board criteria of working in communities with less than 1000 inhabitants, the two clusters went through a separate program. Although training, education, funds etc. were provided for each cluster separately, both Madhavpur first and second share the same water source and intake. However, only the community living in Madhavpur second is included during this study.

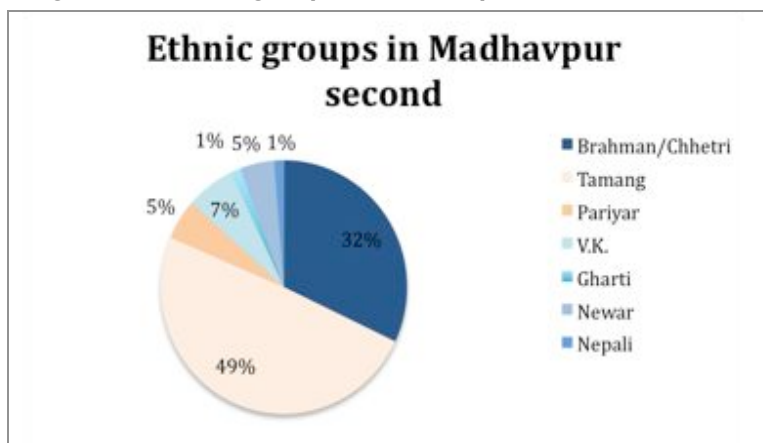
The settlement of Madhavpur second stretches out over a large area, as seen on map 6, on the following page.

Map 6: Schematic map of Madhavpur second



Source: Community map, adapted by Dario Buddeke (2010)

**Figure 17: Ethnic groups in Madhavpur second**



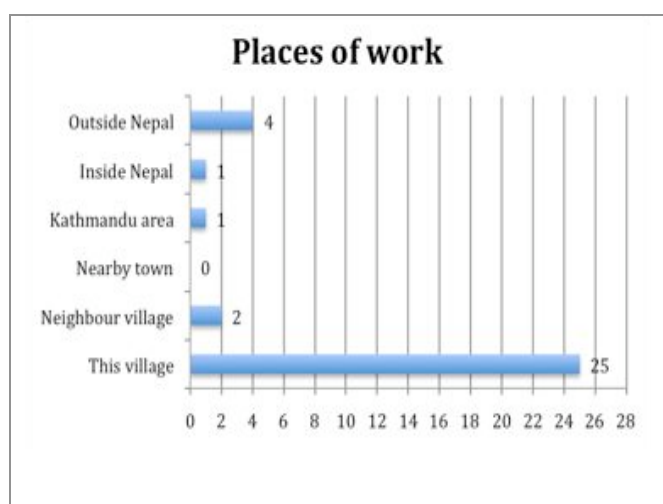
Although Madhavpur second is the largest settlement, there are fewer ethnic groups compared to Sital Tole and Chintutar (see figure 17).

Source: Final report SDRC (2010)

Although some household members in Madhavpur second have a job outside the village or are not farming, the remaining household members are still working on their own land near their house. Farming might not be the most important source of income, it still is a major occupation for most household members (see table 20).

More than half of the respondents work in agriculture or rare livestock. A fifth of all respondents earn wages, from construction or manufacturing in the nearby towns (see figure 18). Since Madhavpur second is relatively well connected to urban areas and other villages, access to local markets is better compared to Sital Tole. Despite the fact that four respondents have one household member working abroad, remittances are not important for their income, with the exception of one respondent.

**Figure 18: Places of work in Madhavpur second**



Source: Household survey (2010)

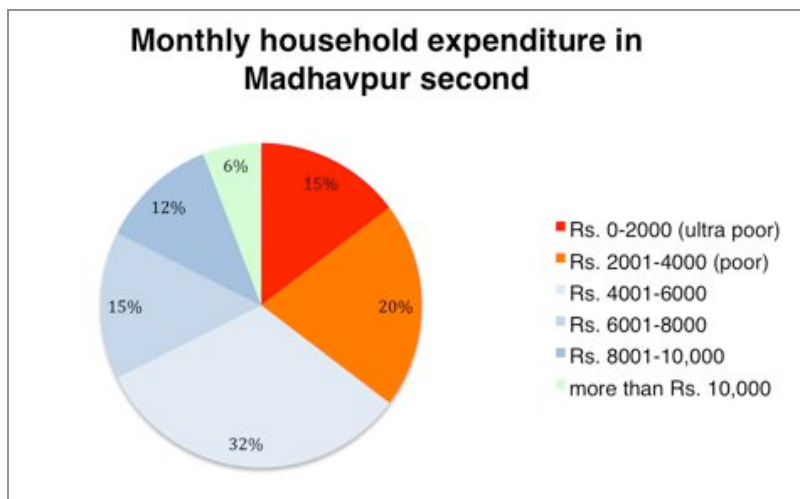
**Table 19: Types of work in Madhavpur second**

Type of Income	Most important all	Second most important all
Farming	21 (61.8%)	8 (23.5%)
Livestock rearing		10 (29.4%)
Own business	1 (2.9%)	1 (2.9%)
Job		1 (2.9%)
Foreign employment	3 (8.8%)	1 (2.9%)
Wages	7 (20.6%)	2 (5.9%)
Remittances		1 (2.9%)
Pension, other support		

Observations during the interviews, combined with the results from the household survey confirm that the community in Madhavpur second has huge socio-economic differences (see figure 19).

Because of the relative good infrastructure (road access, WatSan facility) many people migrated to Madhavpur second. Some 10 households (more than a quarter) have lived in this village for less than 10 years. The immigration is likely to challenge the water supply system, since it is only designed to serve 156 households.

**Figure 19: Monthly expenditure in Madhavpur second**



Those who migrated to Madhavpur second are not necessarily wealthy. Indeed, the most underprivileged people are living a life in despair, without education, access to land and a weak social network. During the household survey, five households are classified as ultra-poor and seven households as poor. However, the prefeasibility-study done by NRCS showed that 28 households are ultra-poor with no access to land or livestock.

Source: Household Survey (2010)

Although the ultra-poor households have access to toilets, the construction of the toilet is improvised and very temporary. Contrarily to other community members, the ultra-poor live in houses made of bamboo and mud. Other households in the same community have bicycles, motorcycle, a multi-storied house, TV, refrigerator or even a computer and several cell phones. So wealth is distributed very unequally in this community (see figure 19).

Regarding the state of water and sanitation before the project, community members had to fetch water from a common well with poor quality water. There were about 200 households sharing one well, mostly female community members had to get up early morning in order to fetch water. Therefore most families did not have sufficient amount of water.

Before the Fund Board project was carried out, toilet coverage in Madhavpur second was higher compared to other communities. 56 private toilets were already in place and an additional 48 were constructed during the Fund Board project. Despite the remarkable toilet coverage, the type of toilets varies largely and depends on the wealth of a household. There were a number of temporary toilets belonging to poor households.

In respect to declare the community as ODF, experiences with the SLTS program in Madhavpur second were not good. Although the school in Madhavpur second received training through the SLTS program, it was not successful to increase toilet construction. Because of its limited impact, the SLTS program did not continue.

## 4.10. Conclusion

This chapter started with an overview about geographical, historical, economic and social aspects relevant to understand the state of development in Nepal. The political struggle between the royal leaders and aristocratic families and later between different parties

influenced Nepal's history, politics and society. Two years after the armed conflict between the Maoists and the government ended, the peace process stands at a critical point.

This chapter also gave a more specific analysis of the WatSan sector, with a brief description of policy responses aiming at improving the situation within the coming years. Also the Fund Board and its approach were introduced, including a very brief presentation of the CLTS and SLTS approach, which are both relevant for the rural WatSan sector. The second major part of this chapter described the regional context of the Tanahun and Chitwan district and provided details about the local context in the three communities. The comparison to other wards in the VDCs/municipality illustrated that access to water and sanitation is a challenge for most people living in rural areas.

Whereas all three communities have access to roads and education, differences in distribution of wealth, the number of ethnic groups, electricity and access to markets for example distinguish the communities. Before the Fund Board project was implemented, all three communities lacked access to drinking water. Toilet coverage was also very low in Sital Tole and moderate in Chintutar and Madhavpur second.

Finally, information about the three communities is fragmented because little information is available in general and the water and sanitation sector at the VDC level in particular.

## 5. Observed Project Outcomes

This chapter analyzes the effects of the projects on the communities with a special emphasis on the six aspects influencing sustainability of the projects. It is vital to look at these different aspects from different angles. Therefore the findings are a combination of answers received from various stakeholders and institutions. Each subsection starts at the community level and ends at a broader level on the particular aspect. Since the overall findings in the three communities do not differ significantly, the findings are listed according to the six aspects instead. If there are differences between the communities, these were noted separately. At the end of this chapter, a comparison between the three communities is provided.

### 5.1. Institutional aspects

As described in the previous chapter, all three communities suffered from lack of sufficient and clean water before the project was implemented. Also only few households had access to a toilet prior to the Fund Board project. Because the VDCs/municipalities are incapable to provide sufficient funds for toilet construction and water supply at the household level, members of all three communities were looking for support elsewhere.

#### 5.1.1. Involvement of stakeholders during project

The process of requesting a Fund Board project was similar in all three communities. Both communities in Chitwan district heard about the Fund Board projects from people in neighboring villages. After meeting the implementing engineer from SDRC, who was working in another community, the chairman<sup>24</sup> in Madhavpur second and female WSUC members in Sital Tole requested a similar project for their community. In an identical process, the chairman of the WSUC in Chintutar was looking for a supporting NGO to improve water and sanitation condition in the village and he got familiar with projects implemented by the NRCS. So in the three villages, demand for a project came from the communities and not from an external agency. It is important to note, that information about the projects is shared merely from word to mouth, rather than via other communication channels.

The SDRC and the NRCS worked closely with the communities once they demanded support. In all three cases participation level did not differ significantly between communities. However there was some difference between participation of WSUCs and community members.

During the pre-development phase needs were assessed and a baseline survey was carried out with the help of local enumerators from the villages. During all three phases the SO worked with the WSUC and facilitated them during in planning, decision-making and the implementation phase. All decisions were made by the WSUC with assistance of the SO, ranging from technical options of toilets, to number and place of tap stands, to who would be responsible to maintain the water supply system. Additionally, the money in the revolving fund was managed by the WSUC only. The WSUC members in the respective community decided about payment modality for upfront cash, which households to provide with loans for toilet construction and the time period to return the loan.

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<sup>24</sup> To simplify who initiated the project and to keep the respondents anonymous, the chairman and female WSUC members are mentioned instead of naming the people. Also the chairmen in Madhavpur and in Chintutar were already leaders in their communities before they got officially elected as chairmen into the WSUCs.



Regarding participation of other community members, their involvement was lower than compared to the WSUC members. Other community members were mostly involved during community meetings, drafting the Community Action Plans, health and hygiene training and especially during construction phase. However, there were some differences between the villages regarding participation of community members.

In Madhavpur second the WSUC invited the community members for regular meetings where plans and decisions were discussed and information exchanged. These meetings were seen essential to ensure that other community members agreed to participate in such a project. Additionally, the WSUC needed the commitment of community members to contribute in cash and kind during the project. Therefore these regular meetings with other community members were considered important in Madhavpur second.

Similar meetings might not have taken place as extensively in the other two communities. Community members in Chintutar and Sital Tole were more reluctant to pay money for the upfront cash. Since some did not attend the meetings or did not understand the scope of the project, they were hesitant to contribute in cash.

So although the WSUC was strongly involved during the project, not all community members understood the means of the project before the actual construction work started.

Insights about the health and hygiene programs can be gained when looking at the involvement of the local schools during the project.

The teachers in Madhavpur and Chintutar received training through the SLTS program from UNICEF, which was partly successful in Chintutar but not in Madhavpur.

After meeting the principals and teachers, it remained unclear how the school sanitation program from the Fund Board was carried out. It seemed that it was not only the school sanitation program of the Fund Board, but as a result of different trainings received by UNICEF and Fund Board combined with the teacher's own ideas that motivated teachers to provide health and hygiene training to students. The teachers did not mention to have had a particular role as health and hygiene promoter during the project.

Regarding involvement of local government, there was a gap between Fund Board policy on paper and implementation in practice. Although the Fund Board states that the SO are required to inform and consult the respective VDC and DDC on all future activities, the cooperation with local and regional government in the three communities was rather limited. Initially, the project proposal needs to be part of the DDC water and sanitation annual planning, otherwise the Fund Board project does not continue. Besides having the proposal signed and included in the annual plan, local authorities of the three communities were not much involved during the project.

### **5.1.2. Involvement of stakeholders after project completion**

Although the WSUC is the key stakeholder to sustain the WatSan system once the SO leaves, not all WSUC members are meeting regularly. Two years after project completion, the WSUC in Madhavpur and Chintutar are meeting monthly to discuss the water and sanitation condition in their village. In Sital Tole however, the chairman said the WSUC would meet when needed and contact the SO in case of a problem.

Similarly, commitment by the SO to meet the WSUC members decreased also after project completion. Although Fund Board requestes the SO to keep in contact with the villages, the WSUCs in Chintutar and Sital Tole are not in regular contact with the SO. Only in Madhavpur second the SDRC is still attending the monthly WSUC meetings. However, WSUC members in Chintutar and Sital Tole would contact the SO if any problem occurs.

Although there have not been any problems with the water supply system yet, a major rehabilitation could become necessary in a few years. So asking the different stakeholders what kind of stakeholder/institution they would contact in case of a major breakdown, indicates also if support and maintenance is properly institutionalized.

Most respondents in Sital Tole and Madhavpur second would first contact the WSUC if there was a problem with the water supply system. Contrarily, only two-third of the respondents would contact the WSUC first in Chintutar, the remaining one-third would contact their friends or neighbors if a repair would be necessary.

Although neither the Fund Board nor the SOs<sup>25</sup> provide any financial support once the project is completed, the WSUC members in Chintutar and Madhavpur would only contact the respective SO. Interestingly, the WSUC members of Sital Tole would ask not only the SDRC but also request assistance from the Forest User Committee and the VDC in case of a major rehabilitation. The case of Sital Tole illustrates, that the different stakeholders should be asked to bear financial responsibility for the water supply system. A combination of funds from local government, community contribution combined with technical support from the SOs would be the ideal case to maintain the system according to the Fund Board policy. However, in reality the VDCs do not know the details about the project and would not have the financial means to fund rehabilitation of the water system in the respective community.

This observation highlights one of the key challenges to maintain the water supply system by community management: although the communities are responsible to maintain the water supply system themselves, according to the Fund Board policy, all three chairmen of the WSUCs think that the O+M fund is insufficient to maintain the system if a problem occurs. Further details about the O+M fund are described under section 5.4.

In sum, involvement during the project of the WSUCs was very high and the involvement of community members fairly high. After project completion however, commitment to maintain the system is less pronounced. Yet, if it comes to the question about who is mainly responsible to maintain the water supply system in case of a major breakdown, the answer is not straightforward but contradictory, with different expectations among the stakeholders.

## 5.2. Social aspects

As mentioned in the previous sections, experiences regarding participation of community and WSUC members during the Fund Board project were positive. Yet, participation as a WSUC member is very exclusive, therefore only a small number were part of the WSUC committee. This section describes who participated and to what extent poor community members profited from the project. Also benefits deriving from the project are discussed in this section.

### 5.2.1. Involvement of female community members

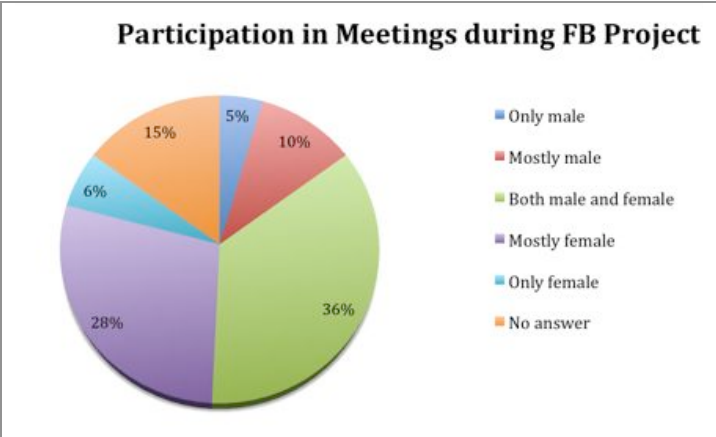
The Fund Board policy emphasizes the importance of involving women at all stages of the project cycle, because women are the main collectors, users and managers of household water (Fund Board, 2009). As seen under section 4.5, women are usually in a weaker position compared to men, therefore it is vital to see to what extent women attended meetings, participated during discussions and to what extent women benefit from the project.

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<sup>25</sup> Although the SO do not provide financial support in case of rehabilitation, they do support communities with technical support

Similarly, since certain caste/ethnic groups traditionally belong to the ultra-poorest and poorest households in a community, their position in society is weak. When the Fund Board aims at including disadvantaged people, it would be mostly manifested in terms of supporting these people during the project. Although the Fund Board asks for community contribution for the upfront cash, it is within the WSUC decision how to organize the collection of funds in the community. Therefore the WSUC would be in the position to support poorest and ultra-poorest community members.

**Figure 20: Participation of community members during project meetings**



Source: Household survey (2010)

First of all, we look at the participation of women during the meetings. In line with the Fund Board policy aiming at equal participation, attendance at meetings between men and women differed not significantly. Especially in Chintutar and Madhavpur second, men and women participated equally during the meetings. However, Sital Tole was an exception, with more female WSUC members and more female participants attending the meetings (45% mostly female).

Figure 20 illustrates participation of men and women during project meetings.

To verify whether participation among men and women is equal during meetings, the focus group discussion provided some interesting insights and confirmed differences between the three communities.

During the Focus Group Discussion in Sital Tole, WSUC members and other people from the community were sitting on the floor and all attendants were discussing in a spontaneous and disorganized way. However, the opposite was observed in Madhavpur second: male WSUC members were sitting on benches closer to the research team and female WSUC members and other female community members were sitting on straw mattresses on the floor further away. Women in Madhavpur second did not participate extensively during the discussion but only responded if a question was directed at them<sup>26</sup>. These examples illustrate that female participation during meetings do not necessarily mean that women also express their opinion but merely attend meetings silently. Nevertheless reaching gender equality is a very ambitious target and surely not achieved during a single project over a period of two years, but merely a long-term process. In that sense, participation of women during the project was achieved to a certain extent.

**5.2.2. Inclusion of poorest community members during project**

Since RWSSP 2, the Fund Board puts special emphasis on social inclusion (gender, caste/ethnicity and disadvantaged groups) (Fund Board, 2007). As the WSUC is the key

<sup>26</sup> Due to the beginning of the growing season only 3 WSUC members had time for the focus group discussion in Chintutar. Therefore evaluating the participation the WSUC members is not reasonable.

group representing interests of the community, it is crucial to include a variety of different community members. Regarding social inclusion, observations in the three communities were positive. According to the Fund Board policy, all the treasurers in the WSUC are female. Although people of different age, gender, ethnic and socio-economic background are members of the WSUC, some respondents of the household survey found the selection process not transparent enough. Indeed, there is a tendency in Chintutar and Madhavpur second that poor community members are underrepresented. It was noted while visiting that fairly wealthy community members are part of the WSUC but to a lesser extent those who are poor.

Looking at inclusion of poor community members in other parts of the project, findings are fairly positive. Overall, all community members are encouraged by the SO to construct their own toilets (temporary or permanent) during the development and implementation phase. In order to support poor and ultra-poor households in toilet construction, the Fund Board set up a community revolving fund and provides a grant to the communities. The money in the revolving fund is used to provide loans for toilet construction for community members in need. Although the WSUCs could decide themselves about the conditions to use money from the revolving fund, it is not necessarily used to support the poorest community members. Despite the fact that toilet coverage is high in the three communities (see table 22), there are differences in the three communities regarding support for the poorest.

**Table 20: Number of households without private toilet**

No access to private toilet	Sital Tole	Chintutar	Madhavpur sec.
Ultra poor and poor	0	1	2
Others	1	1	4

Source: Household survey (2010)

Although eight respondents are in poor (and ultra-poor) economic condition in Sital Tole, all of them have access to a toilet. Only one respondent, who is not poor, has no private toilet. Similarly in Chintutar, only two respondents have no access to a private toilet. One belongs to the ultra-poor household the other, however, is non-poor. In stark contrast is the situation in Madhavpur second: six respondents do not have access to a toilet, whereas two households are considered poor, the other four are non-poor and even among the wealthiest households.

As mentioned before, the decision how to use money from the revolving fund is left to the WSUC. The WSUC in Sital Tole decided to buy at once all the material (pan, pipe and ring) at the market and provide the material with certain interest to the community members. The WSUC in Chintutar provided money from the revolving fund without any interest to its community members for toilet construction. However, the WSUC in Madhavpur second provided money with interest that was occasionally used for other purposes than constructing toilets. The loan was paid back and toilets were constructed at a later stage. Since the WSUC in Madhavpur second decides on providing money to its community members, it is remarkable that 30 ultra-poor households (SDRC, 2010) are still using temporary pit latrines, which are in dire conditions. The chairman mentioned that these temporary toilets would not be up-graded unless there were additional funds from outside the community. So if the WSUC is unwilling to support the ultra-poor households with money, there is no additional funding from Fund Board to support those in need. Also the SOs are mainly responsible for technical support and did not interfere with decisions made within the WSUC. The WSUC is responsible to make criteria how to use the revolving fund and how to address the ultra-poor

and poorest households in the community<sup>27</sup>. Yet, it is left to the community how to ensure permanent toilets are being built. Not all communities, however, are willing and able to take responsibility for other community members in poor economic condition.

Besides the construction of toilets, the contribution for upfront-cash is a burden for many households since there is very little income. Again, the WSUC had to decide about the collection of funds for the upfront-cash. In all three communities, the WSUC collected money over one or two years from those households, which could afford to pay and the WSUC asked those who were poor to work additional days during the construction phase.

Most households worked between 55-75 days during the construction of the water supply system in Sital Tole. Those households incapable of paying money for upfront cash worked additional days during the implementation phase. Similarly, each household had to work 45 days during implementation phase in Chintutar, 13 days in Madhavpur respectively and poor and ultra-poor households contributed more in kind rather than in cash.

### 5.2.3. Benefits of project for women and poor community members

A very positive aspect of the water supply system is not only that taps are accessible for all households but also that all households have equal access to water at any point. As described in section 4.9, fetching water took a long time before the Fund Board project was implemented. Once the water supply system was in place, tap stands are accessible within 15 minutes from each household. Therefore most people, mainly women, can save a lot of time when access to water is improved.

As mentioned in the previous sections, women were encouraged to use their now gained time differently. With the women's technical support service (WTSS), women were linked to microcredit institutes, providing them with small loans for income generating activities. Surprisingly, only 1.2% of all respondents used their time for this type of activity with their time saved. Yet, more than half of respondents were using this time for other household tasks (51.8%) or to study and do homework (36.8%).

Whether the project has benefitted the ultra-poorest and the poor community members in respect to access to water, the answer is remarkably positive. Every household has access to the community taps if the members participated during the project. Yet, few people in the three communities wished to not pay for any water supply system, either because their house was close to a well, or because they would not want to participate throughout the project.

Regardless of contribution for the upfront cash or during the implementation phase, all respondents had access to the taps. In that sense, there is no difference for poor and non-poor community members in terms of access to water.

Although the majority of community members did not participate in the WSUC during the Fund Board project, they should be informed about the WSUC activities and decisions regularly. Whether there is a relation between poverty and being familiar with the WSUC or being informed about WSUC meetings respectively, is not clear (table 23, 24).

Table 23 compares being poor and being familiar with the WSUC as an institution. According to the percentage point difference, there is no clear answer between the communities and whether poverty correlates to not knowing the WSUC. Rather, in all three communities, poor households are more likely to know the WSUC as an institution than the non-poor. This is somewhat contradictory to findings in table 24. The percentage point difference does not

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<sup>27</sup> This is part of an email correspondence with the Program Development Officer of Fund Board and reflects his point of view.

clearly indicate what the relationship between poverty and being informed about what happens at the WSUC meetings is. Interestingly, half of the respondents are informed about the WSUC activities and their decisions in Sital Tole, regardless of their socio-economic background. An equal observation among poor households can be made in Madhavpur. Half of the poor are informed about the WSUC’s activities and the other half does not know about it. Interestingly, slightly more non-poor households know about the activities in the WSUC compared to the poor households in Chintutar. However there is no such difference observed for Sital Tole and Madhavpur. Therefore the relation between being poor and knowing the WSUC and/or being informed about the WSUC activities cannot be derived when looking at the two tables.

**Table 21: Relation between poverty and knowing the WSUC**

	Sital Tole		Chintutar		Madhavpur second	
	Poor*	Non poor	Poor*	Non poor	Poor*	Non poor
<b>Know WSUC</b>	7 (87.5%)	13 (59.1%)	8 (66.7%)	13 (72.2%)	11 (91.7%)	10 (45.5%)
<b>Do not know</b>	1 (12.5%)	9 (40.9%)	4 (33.3%)	5 (27.7%)	1 (8.3%)	12 (54.5%)
<b>Sum</b>	8 (100%)	22 (100%)	12 (100%)	18 (100%)	12 (100%)	21 (100%)
<b>Percentage point difference</b>	28.4		-5.6		46.2	

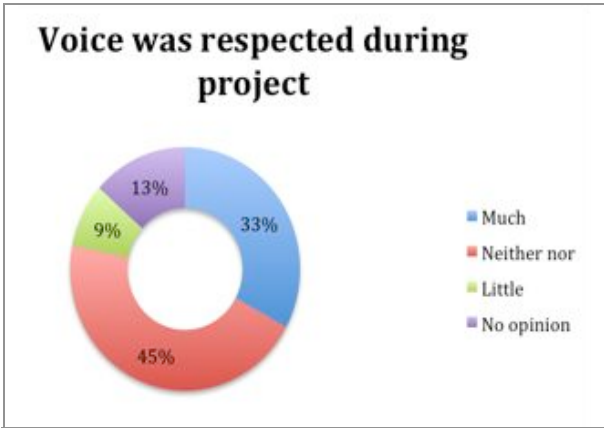
**Table 22: Relation between poverty and being informed about WSUC**

	Sital Tole		Chintutar		Madhavpur second	
	Poor*	Non poor	Poor*	Non poor	Poor*	Non poor
<b>Informed</b>	4 (50%)	11 (50%)	5 (41.6%)	11 (64.7%)	6 (50%)	10 (45.5%)
<b>Not informed</b>	4 (50%)	11 (50%)	7 (58.3%)	6 (35.3%)	6 (50%)	12 (54.5%)
<b>Sum</b>	8 (100%)	22 (100%)	12 (100%)	17 (100%)	12 (100%)	21 (100%)
<b>Percentage point difference</b>	0		-23.0		4.5	

\*The category “poor” includes both, ultra-poor and poor households, living from less than USD 2 a day  
Source: Household survey (2010)

Familiarity with the WSUC is not the only way to receive information about the project, since neighbors or relatives are equally important to get informed about the process of the project.

**Figure 21: Decision power of community members**



Source: Household survey (2010)

Besides being informed, respondents also express whether they felt their voice was respected during the project (figure 21). Overall the three communities did not show great variation in this regard. The majority replied to neither have a lot of influence nor very little, only a third of all respondents felt they had much influence during the project. Yet, only seven respondents (out of 95) reported to have very little influence on the project.

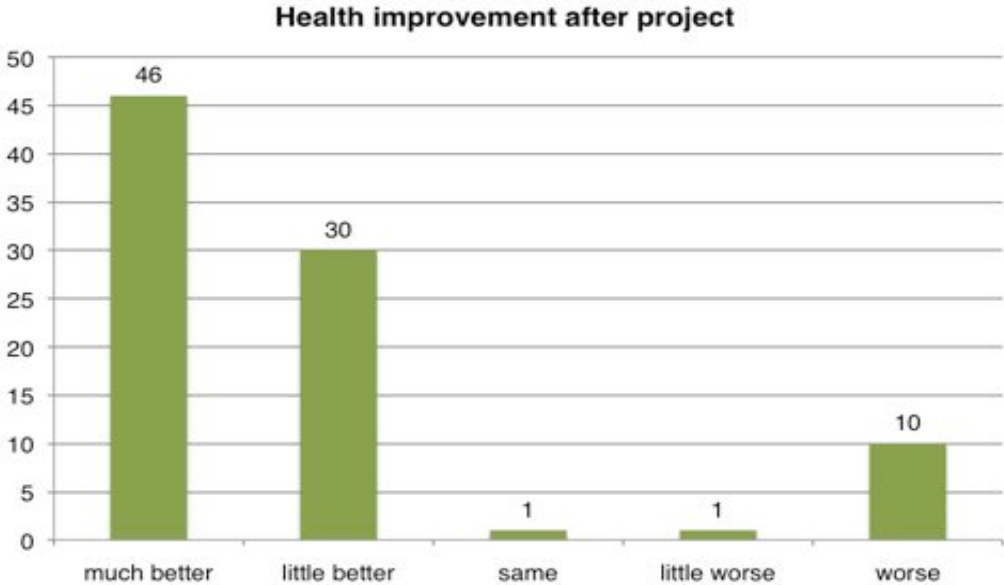
Overall, poor and ultra-poorest households had the opportunity to benefit from the project, especially successful in case of community contribution. Women and people from marginalized groups were elected to be part of the WSUC members.

In sum, women seemed to have benefitted much from the project. Because time to fetch water decreased thanks to the close proximity of the tap stands to their homes, women have more time to do other task, mostly within the household. The poor and ultra poor households have similar access to the taps. There was no evidence that poor community members are deprived from having access to their own toilets. Very few poor respondents did not have a private toilet. Yet, to support toilet construction and/or to improve temporary toilets, the WSUC would have the means to support households with a loan. However, the decision to use money in the revolving fund is within the WSUC only. Therefore temporary toilets, which are the prevalent type for poor and ultra poor households, were not easily up-graded. Yet, not all WSUC members were willing to take responsibility to support poorest households in constructing semi-permanent or permanent toilets. Moreover, it is unclear what the relation between poverty and knowing about the WSUC as institution is. Yet, fewer respondents were actually informed about the WSUC activities than those who knew the institution. Finally, a third of all respondents felt their voice was respected during the project, however, almost half was undecided whether they had a say or not during the project.

### 5.3. Health and hygiene aspects

One of the main positive effects of the projects is improvement in people’s health. Health improved remarkably when using a managed water system compared to drinking water from the river or nearby shallow well, as seen in figure 22.

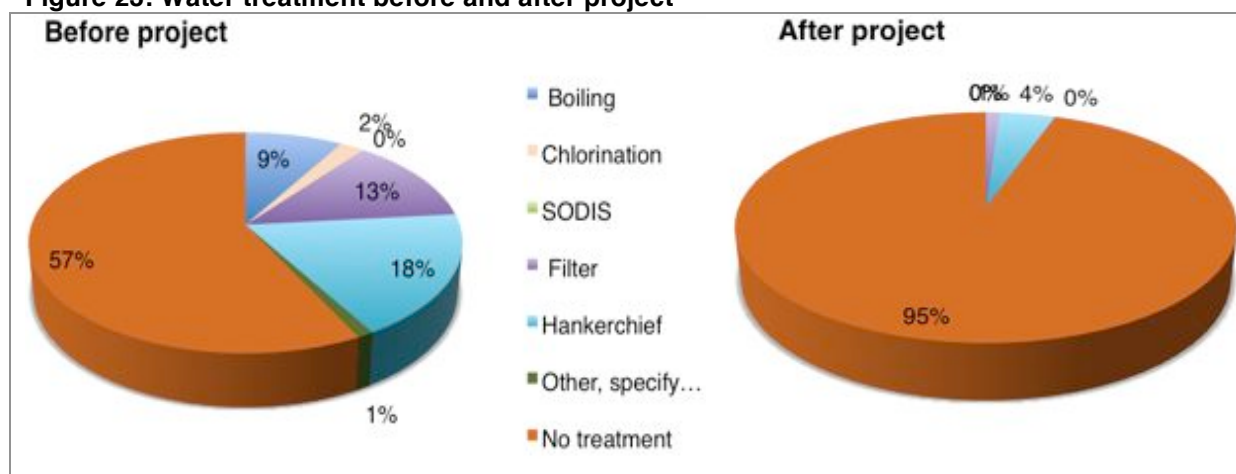
Figure 22: Health improvement after project



Source: Household survey (2010)

A closer look at the figures, it indicates that ten respondents felt their health has not improved, but worsened. These unexpected responses were a summary of many problems affecting health. Respondents mentioned negative impacts from age, labor-intense work, accidents and other project-unrelated reasons. Still, some respondents also mentioned that the water at times before and during monsoon months was found smelly and polluted. Indeed, figure 23 on water treatment could provide additional insight in why respondents felt their health has worsened.

**Figure 23: Water treatment before and after project**



Source: Household survey (2010)

Although the Fund Board aims at providing water sources that are unpolluted, undisputed and yield at least 45 liters per capita per day (Fund Board, 2009), the quality of water at two sources could have been insufficient for drinking, as described more detailed in section 5.5. Since many people assume that the water quality is sufficient when receiving such a project, water treatment becomes obsolete. Yet, only five respondents are treating the water before drinking following project implementation (see figure 23). To ensure better water quality, either more training from the SO is required or the water needs to be treated before distribution. Despite the fact that the SOs have carried out several water quality tests, two out of four sources looked contaminated. The Fund Board does not provide any treatment prior to water distribution.

Despite the reasons for negative health impact, the large majority of respondents found their health has improved remarkably after project implementation. This is also a result of increasing hand washing practices. Interestingly almost all respondents wash their hands after defecation (90.4%). Also 87% wash hands before having food and 64% of respondents wash hands after coming into contact with waste<sup>28</sup>. Still, few respondents are also using the jungle besides the toilet.

Taking into account these numbers, it seems that people are aware of the relation between transmitting diseases and washing hands. Especially, the information provided by the female Village Health Promoter (VHP), who visited each household, could have had positive effects on health and hygiene. Nevertheless, some respondents are still not using their toilets, or only during daytime, also only 47 respondents are washing hands after cleaning their baby's excreta.

So whereas health and hygiene improved over all, more training and raising awareness is necessary. Indeed, 64.5% of all respondents emphasized that more health and hygiene training is necessary to improve sanitation condition in their community.

The schools also went through the 'school sanitation program', whereas the teachers and students were trained. Although students received this training, they did not have a particular role during the Fund Board project in emphasizing behavior change within the community. With the information provided by the VHP and the help of students, who could act as triggers,

<sup>28</sup> These figures might not reflect people's actual behavior but more so what is socially acceptable. Taking into consideration the sensitivity of this question, it is debatable whether one can deduct any meaningful information from it.



it is more likely to achieve total behavior change in the community.

In sum, health and hygiene improved remarkably during and after the project. Thanks to piped water from a spring source, high toilet coverage and increased awareness of hand washing practices, community members fell less ill. Yet, some respondents feel their health has worsened, which could derive from the lack of water treatment and/or not sufficient hand washing. Finally, the school could act as additional trigger along with the VHP to emphasize total behavior change in the community.

## 5.4. Financial aspects

The Fund Board adopted several mechanisms to ensure financial transparency. On the one hand, different accounts were established, on the other hand, the WSUC has to keep book about community contribution for upfront-cash, expenditure from the revolving fund and for the establishment and maintenance of the O+M fund.

In order to prevent conflict between the community and the SO, the Fund Board establishes different accounts; one for construction costs, shared by both parties and the other for the community development activities, which is only accessible by the SO. At the end of the project, the community alone has access to the remaining funds if there are any left. Payments to both accounts are made after completion of specific tasks under the contract, which are checked regularly by the SA. In the field, these separate payments showed mixed results. On the one hand, money for the construction material was only paid after the community purchased the material themselves. Although this mechanism ensured that money did not leak out and costs were kept transparent, not all communities were able to pay for material and had to take out a loan beforehand. Most communities do not have immediate access to the amount of money needed and face difficulties to buy all material at once.

**Table 23: Financial contribution to water supply according to community**

	Sital Tole	Chintutar	Madhavpur
Fund Board	805,806 (76.5%)	1,081,336 (73.5%)	3,081,800 (83.8%)
Community in cash/kind	236,848 (23.5%)	390,390 (26.5%)	596,836 (16.2%)
Total	1,052,693	1,471,726	3,678,636
VDC/Municipality <sup>29</sup>	40,000	65,000	50,000

Source: Interviews and final reports SDRC, NRCS (2009/2010)

The cost sharing mechanism is a unique feature the Fund Board has adopted. Each community is asked to contribute all unskilled labor (during construction phase), locally available material and porter fees. Also the communities have to contribute in cash with at

<sup>29</sup> The VDCs had to spend some amount of their annual budget (see section 4.8). Until today, it is still debated how the government money was spent. Some WSUC chairmen said they received money for the maintenance of the water supply system, others said some households received Rs. 1250 for construction of toilets and a third party mentioned that they received financial support for the upfront cash. During the Fund Board meeting, these statements were debated and it is still unclear what the financial responsibility of VDC/Municipality is during Fund Board projects.

least 2.5% of the total construction costs. Figure 25 provides an overview of financial contribution from Fund Board, communities and the VDC.

As mentioned in the previous sections, many households lacked access to toilets and did not have sufficient money to invest, therefore financial incentives from the Fund Board were provided through the community revolving fund. The WSUC decided about the payback mechanism. For some households, receiving a loan is necessary in order to construct a private toilet, others construct toilets without additional funds from a third party. Table 26 illustrates the numbers of toilets constructed during the project using the revolving fund.

**Table 24: Number of toilets and average costs**

	<b>Sital Tole</b>	<b>Chintutar</b>	<b>Madhavpur</b>
Toilets constructed during project	27	45	48
Toilet costs average (Rs.)	5500	5000	6087
Loan (Rs.)	2000-4000 (in material)	2000	3000-5000
Interest rate	12% in 6 months	0% in 3 months	6% in 3-5 months

Source: Household survey (2010)

Since community contribution is a major part of the Fund Board policy, the community members expressed difficulties in collecting money. More than 85% of all respondents found it difficult or very difficult to pay for the upfront-cash for construction of the water supply system. Contrarily, around half the respondents in Madhavpur and Sital Tole found it not difficult to invest for toilet, the other half found it difficult. In Chintutar, 80% did not find it difficult to obtain money for their toilet. This observation is indeed different from the other two communities. With involvement of a biogas company, toilet construction attached to biogas was highly subsidized in Chintutar, which indicates why respondents found it less difficult to invest in their own toilets.

To sustain the water supply system, the communities have to collect money for the operation and maintenance fund. This mechanism ensures that each household pays a monthly fee, which is partly used as salary for the village maintenance worker (VMW) but also as saving for minor and major repairs. In all three communities the O+M fund is still in place, as seen in table 27, and most respondents are paying their monthly O+M fee. However, some respondents in Chintutar mention different amounts for O+M fee, thus it is not entirely clear what the defined amount was in that particular case.

**Table 25: Operation and Maintenance Funds according to community**

	<b>Sital Tole</b>	<b>Chintutar</b>	<b>Madhavpur</b>
O+M Fund (Rs.)	38,185	74,000	83,000
Monthly fee per household (Rs.)	15	5-10	20

Source: Household survey and interview (2010)

Although the O+M funds is still in place, the funds at this point would not be sufficient in case of a major breakdown in any of the three communities. Natural hazards such as landslide, earthquake or floods, which are common especially during the monsoon months, could damage the system. Even in case of VDCs contribution for maintenance, their budget for the respective communities would be insufficient.

Overall, it is challenging to maintain the water supply system once the project and the funding has stopped. As seen in the introduction of the thesis, Bhattarai and Adhikari (2009) estimate that around 20% of FB schemes are defunct and need major repair after 5 years. Thus, in case of a major breakdown, the communities would not be able to repair and maintain the system themselves. However, the Fund Board does not provide any additional funds in case of a major breakdown once the project is completed.

In this section, financial aspects, especially financial transparency, were discussed and difficulties in paying for the upfront cash were mentioned. Interestingly, most community members found it less difficult to invest their money for a private toilet, compared to investment for the water supply system. Looking at financial maintenance, the findings in this section are less positive. Although the communities have an O+M fund in place and still collect a monthly fee from each household, the amount of money would be insufficient in case of a major breakdown, regardless of additional funds provided by the VDCs.

In the long run, financing the water supply system is a key challenge not only for the Fund Board projects, but also for all other WatSan schemes in Nepal.

## 5.5. Environmental conditions

Generally all three communities are kept clean, and non-organic waste is usually dumped at a common place and burned. Although most toilets are kept in good condition, those with temporary structure are found to be challenging to sustain.

### 5.5.1. Waste treatment

In Sital Tole and Madhavpur second the WTSS provided cement rings for waste collection. In rural areas, there is not as much waste to begin with compared to urban areas. Besides the waste collection in these rings, it is a common practice to throw garbage near the riverbank, to burn it and to wait for the monsoon rain to wash it away. Thus a common dumping ground near the river can also be found in Sital Tole community.

**Figure 24: Waste collection in Sital Tole**



Source: Own pictures

**Figure 25: Waste collection in Madhavpur second**



Interestingly, the surrounding and entrance of the houses is always kept clean, regardless of the socio-economic background of the household. Also most of the permanent and semi-permanent toilets are in good condition and kept clean, there were few flies inside the toilets and in most cases people closed the doors to prevent animals from entering the toilets.

Generally respondents mentioned few problems with their toilets, only if they are temporary. As mentioned earlier, the WSUC would have money from the revolving fund, which could be used to support those households incapable to invest for toilet construction. Though not all WSUC members are inclined to support those households for up-grading their temporary toilets. Besides the attempts of the chairman in Madhavpur second to request additional funds from the SDRC to up-grade these permanent toilets, their status remains the same, unless additional funds are paid. It remains unclear why the WSUC members decided to not support those households using temporary toilets with money from the revolving fund.

**Figure 26: Temporary toilet**



**Figure 27: Semi-permanent toilet**



**Figure 28: Permanent toilet**



Source: Own pictures

Focusing on waste treatment from toilets, most respondents do not know how to treat toilet waste once their pit latrines fill. Since all projects were just finished one or two years ago, community members did not have to empty the pit yet, so therefore no experiences were made so far.

In respect to other organic and non-organic waste, animal waste is either used for biogas production or as fertilizer in the fields. Most respondents give their kitchen waste to the animals. Other waste such as plastic is burnt and glass is dumped at the riverbank. Since all taps are kept clean, there was no complaint so far about sanitation condition around the tap.

### 5.5.2. Conditions at the water sources

As mentioned in section 5.3, conditions at the water source differed remarkably between the communities.

Since the water supply systems were recently constructed, collection tanks, transmission and the distribution lines are in good condition and well maintained. Besides that, there is a 15 cm gap in the transmission line at the Madhavpur scheme. It could be the case that small particles or waste could fall in and contaminate the water since the gap is in the middle of a road inside another village.

Regarding the state of the water source, the following photos illustrate the condition at the water sources in each community. Keeping in mind that most community members do not treat the water before drinking.

Figure 29 shows the chairman standing at the water source in Sital Tole. The water source was completely unprotected at the end of the construction phase. Only after realizing that many boys of other villages were taking a bath at the source, the WSUC decided to fill the source intake with bigger stones. Nevertheless, animals or people can easily walk further up the river to use the water, which could impact the water quality for the Sital Tole community. At the time visiting, the source looked yellow and contaminated with algae. As mentioned earlier, there is neither water treatment at the source nor at the collection tank, unless the users treat it before drinking.

**Figure 29: Water source in Sital Tole**



**Figure 30: Retaining wall at the water source in Sital Tole**



Source: Own pictures

The WSUC members in Sital Tole mentioned that the water quality has decreased during monsoon months and that it turns yellow during this time. Still, people assume that the water has drinking water quality and do not treat it prior to drinking.

In Chintutar observations regarding condition at the water source are mixed. As mentioned earlier, the houses in Chintutar are scattered, therefore two different sources are tapped in order to serve all households.

**Figure 31: Water source 1 in Chintutar, serving 2 taps**



**Figure 32: Water source 2 in Chintutar, serving 15 taps including school**



**Figure 33: Intake at water source 2 surrounded by algae and organic waste**



Source: Own pictures

The first source (figure 31) is about 15 minutes walking distance from the primary school and serves two taps only. The source was originally tapped further down but found inadequate by the engineer during the development phase; instead water from a small river nearby is used. The source is protected with stones and surrounded by concrete intake. The collection tank and transmission lines are in very good condition.

Compared to the second source, the observations are quite different. The second source (figure 32,33) is 30 minutes walking distance further up the village inside the jungle. This source delivers water to the primary school and the remaining 13 taps, which are shared by 75 households. Yet, houses of the Darai community are mainly using water from the second source. Few villagers are going to this second source because it is known for being a monkey territory and monkeys attacked people if they are alone. Besides monkeys living in this area, there is no livestock and no human activities near the water source that could contaminate the water. Still, the source is unprotected and looks muddy. Small fishes, tadpoles and leaves are in the pond and mud surrounds the pipe, eventually clogging the small holes in the intake. Similarly to other communities, there is no water treatment at the intake, collection tank or at any other junction. Other than three households, community members do not treat the water before drinking.

Contrarily to the two cases presented above, the water source in Madhavpur (1+2) was in very good condition and well protected (see figure 34,35). Because there was no feasible source near the community, the WSUC had to purchase land from a farmer living at another VDC. The source near Madhavpur is a 40 minutes bike ride away from the village. The source is in between two riverbeds and the water is naturally filtered through sand, as seen in figure 35. At the beginning, the farmer who sold the land was using chemical fertilizer on the fields nearby, after some time the WSUC and the farmer came to an agreement that he will abandon to use chemical fertilizer near the source. The water source itself is well protected and the risk of contamination besides the small plant is low. Collection tanks and transmission lines are in good condition.

**Figure 34: Water source in Madhavpur second**



Source: Own pictures

**Figure 35: Intake in Madhavpur second**



## 5.6. Technical aspects

One of the main goals of Fund Board projects is to deliver sufficient amount of water for all users. As mentioned earlier, the Fund Board provides 45 liters per person and day. In addition, public taps instead of wells are provided, shared by 7 to 9 households. In the three communities however, there are up to 10 or as little as 2 households sharing a single tap. Despite that the households have equal access, water is not always available 24 hours a day. Although 65.5% of the respondents have water for 24 hours a day available at their tap, 21% of respondents have only water for 3-6 hours and 8% for only 1-3 hours a day. Despite the fact, that all households have equal access to the taps, 44% of respondents in Sital Tole assume that other households get more water and only 48% thought they get an equal amount of water. Similarly in Madhavpur, 33% of respondents assume that others get more

water, whereas 66% assume it to be equally. Interestingly, 90% of respondents in Chintutar think to have equal share of water.

As far as construction is concerned, the water supply systems in all three communities is constructed in a way to meet the users needs. Similarly water taps, transmission line and water intake are in good condition, besides the small gap in the transmission line in Madhavpur. Although the gap in the transmission line is not significant, fern was growing, indicating that the gap must have been there for quite some time. Since part of the transmission lines passes through other villages near Madhavpur, illegal water extraction was likely but has not been observed yet. Additionally, it remains unclear why the water source in Sital Tole is uncovered and how one source in Chintutar is protected and the other is not.

### 5.6.1. Technical options for water supply system and sanitation

Part of being enabled to make decisions, derive from having several options one can choose from. The WSUC and community relied heavily on the expertise of the SO regarding options for toilets and water supply. Although there are many different types of toilets available, the options in the three communities were limited to a few. In Madhavpur second and Sital Tole the WSUC reported that the SDRC presented two different sanitation options (pit and double pit latrine) and the WSUC chose the less expensive one. The SDRC also mentioned the option to install an Ecosan toilet but the SDRC did not provide more details. In the end, the WSUC presented the cheapest and most reliable option to its community members. Whereas the choice of options was limited to a few in the Terai communities, the options presented in Chintutar included simple pit latrine, also attached to biogas and the Ventilation Improved Pit (VIP). Because the NRCS linked the community to a biogas company, technical and financial support to attach toilets to a biogas facility was provided. Many households made use of this offer and have profited from a limited daily amount of gas available for cooking.<sup>30</sup>

Since the projects were finished only two years ago, 82.5% of the respondents did not have any problems with the existing permanent toilets so far. Problems with temporary toilets are more pronounced, ranging from toilets, which are getting filled too quickly, foul smell and some toilets that required repair already. Because of the temporary character of these toilets, their lifetime is relatively short. Without improving the structure, temporary toilets need frequent rehabilitation and are vulnerable especially during the monsoon.

In sum, the water supply systems are designed and implemented in a sound way. All households have equal access to the taps, however respondents did occasionally feel they got less water than other households. Regarding options for toilet constructions, only few options were presented by the SDRC to the communities in Sital Tole and Madhavpur second. Because NRCS linked the community to a biogas company, which provided technical and financial support, many households could afford to attach their latrines to a biogas facility.

Lastly, the water supply systems and the permanent and semi-permanent toilets were in good conditions and well kept by community members.

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<sup>30</sup> Apparently, interest for latrines attached to biogas is great in Madhavpur and the research team could provide the contact of the main biogas company BSP (Biogas Sector Partnership Nepal) to the WSUC members.

## 5.7. Comparing the three communities

The three communities are very different in their ethnic composition, access to other infrastructure, community ties and in socio-economic aspects. Moreover, there are numerous differences between the three selected cases such as population size, access to infrastructure, wealth distribution, number of taps, toilet coverage, participation of WSUC members and many others aspects.

However the three cases also represent two common habitats for a large majority of Nepalese people. As mentioned before, the Terai is highly populated and many people also live in hilly areas. Since more than three quarters of the population still live in rural areas, access to water and sanitation is a major challenge for most. Despite the fact that the three communities are set in rural context, they do not necessarily represent other rural communities in Nepal. Because they are easily accessible by transport and are relatively close to urban areas, the conditions are more favorable than in areas where roads, electricity, markets, social infrastructure and other services are completely lacking.

Despite the differences between the three cases and other remote communities targeted by the Fund Board project, the three have also some similarities.

The three communities suffered from poor drinking water and to a lesser extent from inadequate sanitation before the Fund Board projects were implemented. While the projects in all three cases were demand driven, the participation level varied in the three settlements. Although the WSUC members should be equal, there are notable differences in the way women and men participated. Despite the fact that most women attended the meetings, it does not necessarily mean that they expressed their opinion as seen in Madhavpur second. Community and WSUC members in Chintutar were not interacting as much as community and WSUC members in Sital Tole. In the latter community, more women than men are WSUC members and during the focus group discussion men and women were talking simultaneously.

## 5.8. Conclusion

The aim of this chapter was to provide the initial findings of the impact of the water and sanitation projects implemented by the SDRC and NRCS, respectively. A brief summary of these finding is as follows. Starting with the institutional aspects, although community members were largely included during the project, the school could have a more prominent role in order to facilitate behavior change in the community. In addition, coordination with local/regional government was kept minimal. Social aspects such as participation and social inclusion were found positive. Slightly more women participated during the Fund Board project and ethnic minorities were included to become WSUC members. Poor community members were included and informed during the project. All households who participated in person and with cash or kind benefitted from the project equally. Although financial transparency was kept and well institutionalized at the community level, the O+M funds are insufficient at the community and VDC level in case of a major rehabilitation of the water supply system. Environmental aspects were merely positive, the surrounding in the communities itself was kept clean, waste was burnt and taps and toilets kept clean. However, the sources in Sital Tole and source 2 in Chintutar were not covered and are likely to be contaminated. Lastly, regarding technical aspects, the water supply systems were designed and implemented in a sound way. However, few options for toilet construction were presented and those with temporary sub- and superstructure are challenging to sustain, especially during the monsoon months.



Finally this chapter ended by comparing the three communities. All information in this chapter was provided according to the answers received in the communities, at the VDC and DDC level and compared with the SOs observations. Additional information on the local and regional level was very difficult to obtain, therefore these findings have to be considered as limited to the respective time and context.

## 6. Achievements and Drawbacks of Fund Board Projects

This chapter starts with summarizing the positive aspects of the Fund Board projects. Then aspects to reconsider are mentioned in the second part, followed by comparing the Fund Board projects in the context of achieving sustainable outcomes with findings in academic literature. Finally the future of the Fund Board projects is briefly discussed with different scenarios on how projects will proceed.

### 6.1. Positive aspects

The Fund Board projects were in all three cases clearly demand driven. Although one or few community members took the initiative to request a project, the support for toilet construction and the provision of piped water systems benefitted most of the community members.

The largest benefits from the water supply system are time saving and health, hygiene improvement. Before project completion, most women had to spend many hours a day to fetch water from either a river or a well with poor water quality. However, due to the piped water supply close to their dwellings, time to fetch water (of better quality) decreased remarkably. Furthermore, all households, regardless of their wealth, have free access to water at any time. Community members do not have to pay for the amount of water they used per month, yet there is a small monthly fee to pay for the O+M fund, which most respondents agree to pay. Besides an unexpected increase in household numbers or depletion of the source, the water supply system in place seems sufficient for the needs in the community.

Almost all respondents have access to their own toilet (see figure 49). Remarkably, more households belonging to the poor category have access to a private toilet compared to the non-poor households.

Besides the demand driven aspect, the projects implemented were very participatory. The WSUC was strongly involved during every stage of the project and decided on all relevant aspects concerning water supply system. The NRCS and SDRC were both merely facilitating the WSUCs throughout the project. Moreover, the remaining community members were less involved but participated at various stages, for example attending and participating during meetings, carrying out the baseline survey with the SOs and discussing and drafting the CAP during the development phase and contributing with their labor during the construction of the water supply system. Additionally, looking closer at who participated, the findings for female participation were positive. Women have a special role during the entire project, at least three female members are part of the WSUC. Additionally, thanks to the WTSS, women have the opportunity to be linked with microfinance institutes to make use of their gained time to focus on income generating activities. A female village health promoter visited each household to educate people about health and hygiene. Regarding the sensitivity of hygiene behavior, it is vital to have a female expert providing training to other women. Since women usually carry out almost all household activities in Nepal including cooking, washing, taking care of babies, cleaning etc., women are the most important target group for health and hygiene interventions. Since women are traditionally marginalized in Nepal's society, the Fund Board approach with its various project components is aware of these inequalities and aims at improving women's position. Additionally, Fund Board's policy states that the WSUC has to include members belonging to lower casts, which was the case in all three communities.

Since Fund Board works directly through the SOs with the communities, there was little delay in project implementation. As mentioned in section 5.4, financial transparency was maintained throughout the project. Similarly the WSUC members have very detailed documentation about the project finances, participation and outcomes available. Therefore,

Fund Board not only keeps its finances transparent but also helps to strengthen capacity of WSUC members.

Finally the O+M fund is still in place in all three communities and the VMW is observing all parts of the water supply system on a regular basis. All three communities are in regular contact with the local government and receive financial support during and after the project. Also there are annual funds from local and district government for maintaining the water and sanitation facilities available for all wards including the three communities.

## 6.2. Aspects to improve

Although the Fund Board projects visited in the three communities were rather successful, there are key aspects that need to be improved. The recommendations have additional relevance for other organizations working in rural water and sanitation sector.

Maintenance is one of the biggest challenges to sustain a water supply system. Most water supply systems of Fund Board are constructed to last for 15-20 years. However, if there is a landslide, earthquake or flood or any other unpredictable event damaging large part of the infrastructure, it is central to ensure sufficient funds are available for repair. Although the O+M funds are in place and have been maintained in all three communities, the money would be insufficient for a major rehabilitation. Despite the fact that the VDC/DDC are providing each ward with a certain amount of money for WatSan, their financial contribution would not be sufficient either.

Although more poor households have access to toilets compared to the non-poor, their toilets are often temporary and are likely to be destroyed by natural hazards. Despite the fact that the WSUC members could use money from the revolving fund as grant to up-grade temporary toilets, this was not the case in the communities. It seems that the community would have the tools to support weaker members by using either loans from the revolving fund or by providing them with a subsidy. However, it is left to the WSUC members how to ensure permanent toilets are being built. Not all communities are willing and able to take responsibility for other community members in poor economic condition. In that sense, the Fund Board approach aims at being pro-poor but the final decision about who to support is left to the community, and primarily to the WSUC members. The implementing SO could raise more awareness about why it is important to have a permanent toilet and also emphasize that all community members would be adversely affected if a few people stopped using their temporary toilets once they collapse.

As the Fund Board projects consist of four main phases, there are always gaps between the phases, which are an obstacle for the SOs. Since the Service Agencies have to assess whether the community and the SO have fulfilled certain targets at the end of each phase, the SO does not continue its work with the community during these months. Also the SOs do not receive any salary during these months when performance is assessed. In order to keep the engineers and other staff of the SO continuously involved, it is best if these assessment phases can be kept short.

Despite the fact that the SO and the SA were evaluating the quality of the water source at several instances, two out of four sources were uncovered and likely to be contaminated by livestock and/or human activities. Additionally, if water quality is not sufficient, people should treat the water prior to drinking; this behavior has significantly decreased once the project was implemented.

This observation leads to the last point, which needs to be improved. Although a school sanitation program was carried out, the students itself did not have a designated role in

promoting absolute behavior change in the community. Since the school is a permanent institution in the villages, students and teachers could be more involved in promoting sanitation behavior. The health and hygiene training by the VHP could become more effective when coupled with stronger involvement of students and teachers. Taking into account the success of CLTS and SLTS program by UNICEF, students could indeed be used as trigger and advocate behavior change.

### 6.3. Towards sustainable water and sanitation projects

Asking about whether the three projects are sustainable in terms of equity and environmental aspects, the conclusion is positive. The water supply system meets the need of the present population without actually compromising the ability of future generations to meet their own needs. The sources tapped, are estimated to have the same flow in the coming years (without taking into account sudden climate changes). Although the design is made to serve the current number of inhabitants, it is likely that the population will increase, as seen in Madhavpur second. Therefore availability of sufficient water from the current water supply systems will be challenged. Still, as stated in Agenda 21, all community members have equal access to water, regardless of their socio-economic conditions.

Furthermore, with the WatSan system in place, there is no loss in future economic opportunities, neither adverse impacts on social conditions, human health and the environment (see Mihelcic, 2007). Because the sources tapped are either close to the community as in Chintutar or the land around the source is purchased as in Madhavpur, ensured that the sources are undisputed.

Moreover, community members have the unique opportunity to have access to save drinking water in close proximity to their houses, which significantly decreased time and effort of fetching water. Piped water at community taps combined with access to private toilets resulted in remarkable health improvement. The combination of health and hygiene training at community and school level in addition to participation during the intervention led to a reduction of diarrhea. Pokhrel and Viraraghavan (2004) come to a similar conclusion about the effectiveness of an intervention to reduce diarrhea.

Additionally, many women were given the opportunity to participate in the WTSS, linking them to microfinance institutions. The focus on women during the project is seen very important throughout the literature, emphasized in the IWRM principles and mentioned by various authors (Agarwal, 2000; Zwarteveen & Meizen-Dick, 2001; Pokhrel & Viraraghavan 2004).

Furthermore, community-driven projects are strongly advocated by the World Bank, assuming to result in more sustainable outcomes than if facilities are donor-driven and implemented in a top-down manner. As seen in table 28, most of the goals of the World Bank for community-driven development projects are actually met by the Fund Board projects.

**Table 26: Criteria of community-driven development projects according to the World Bank**

Goals of community-driven development	Achieved in three communities	Comments
Enhance sustainability	Partly	Some aspects are increasing sustainability others are challenging it
Improve efficiency and effectiveness	Yes	Fulfilled during project
Poverty reduction can be scaled	Yes	Fulfilled during project
More inclusive development	Partly	Community members were included to a large extent but not so the local government
Empowering poor people	Yes	Policy to include different WSUC members, Sanitation Revolving Fund
Building social capital	Partly	Partly, fulfilled at community level but not at governmental level
Strengthening governance	Partly	Partly, fulfilled at community level but not at governmental level
Complement market and public sector activities	Yes	Fulfilled

Source: World Bank (2004) and own data

Looking closer at different sustainability aspects, the conclusion is more nuanced.

Participation is said to improve ownership and to positively contribute to sustainability (see Doe & Kan, 2004). To sustain rural infrastructure, the authors concluded that community management is working well if the community is involved in planning, decision-making and is even contributing money/labor, as it is the case in the three communities. Nevertheless other external factors such as the institutional setting influence strongly the success of community-based projects (see Mansuri & Rao, 2004). Although the Fund Board policy states the SO should be in regular contact with the local and regional government, the exchange was minimal (similar to other NGOs working in the sector). Similarly, once the projects were completed, the SO does not keep regular contact to the communities. Maintenance of the system is not shared equally among the different stakeholders. Financial maintenance of the facilities is challenged in the long run, which negatively impacts the sustainability of the water supply systems.

Similarly to Busari's observation on Swaziland (2009), scheme rehabilitation is indeed a trade off between the costs of repair and the benefits for the community. Hence when a major rehabilitation is needed, it is likely to be beyond the financial capacity of a community to do so. In all three communities, the amount of money available in the O+M fund would be insufficient for a major rehabilitation. Therefore, as cynical it might sound, it could be more feasible to request a new project from the Fund Board instead of an extensive rehabilitation, even after 5 years after implementation of the current system. Therefore long-term maintenance is relatively complex and difficult to achieve, as multiple internal and external factors influence it.

Overall rural communities as main beneficiaries of the Fund Board projects are highly involved and empowered during the project. The water supply system and sanitation facilities positively impact the community's health and well-being. At the same time receiving training about health and hygiene positively contributes to their development. Also other aspects such as the WTSS, the training for VHP, VMW and the WSUC members help to strengthen people's capacity and expand their knowledge. Still there are aspects that need improvement, as mentioned before.

## 6.4. External factors influencing extension of services

Despite the internal factors influencing whether access to water and sanitation can be sustained for a long time, various external factors are important to take into account when assessing sustainability of development interventions in rural areas. These external factors do not only influence projects implemented by the Fund Board but are defining the circumstances development projects have to be carried out.

### 6.4.1. Political instability

At the time of writing, the prime minister has still not been elected. As a result, the political struggle between parties continues to hamper the work of parliament. Not only the election for prime minister is important, but also the entire peace process stands at a crucial point. The power struggle between the Communist Party of Nepal Unified Marxist-Leninist (CPN-UML) and Unified Communist Party of Nepal (Maoist) continuous and has not yet ceased the deadlock. Due to the frequent political power struggles, the state loses further its legitimacy and weakens its ability to create a law-governed framework for peace building (Dahal, 2010). This ongoing political instability does not only mean insecurity for its citizens but also impedes the work of NGOs. Also elections at the local and district level are negatively affected if the central government is not in place. Since elections are only held once the new constitution is in place, the authority of the DDC is weakened. As an example, it comes as no surprise, that the DDC secretaries in the Chitwan district have not been reelected. As a result, the Local Development Officer is taking over the tasks at the DDC level in Chitwan. Because of the understaffed, underpaid and illegitimate nature of the LDO at the DDC level, it is very difficult to carry out both tasks (LDO and DDC secretary) at the same time. This could explain why the LDO has neither the capacity nor the means to coordinate activities from NGOs in its district.

With the unstable nature at the political level, it is also very challenging for NGOs to work with local and regional governments. When provision of basic services is provided by NGOs instead of the government, effects are contradictory. Because of political instability, the NGOs favor to keep the interaction with the government at a minimal level. The tendency to bypass the government and provide basic services to the people does not make the government in any way more accountable. Rather because NGOs take over government responsibility, they are at the same time undermining the state even more. Still, because democracy is fragile and the state very weak, the work of NGOs to improve living conditions for people becomes more justification. As seen in a study about the willingness to pay for water supply services, poor and non-poor households in Kathmandu Valley are clearly favoring privatization plans compared to the provision by the state. Even though this would mean households would have to pay far more for these services (Whittington et al. 2002). Although the privatization of water supply delivery is not relevant in the rural context, there is a tendency in urban areas. So although every citizen of Nepal has a right to water, the quality especially in urban areas is very poor. Because the government of Nepal is not capable to extend water supply service to its citizens, many assume that the private sector is able to deliver more reliable service and better quality of water.

Yet, although the secretaries at the VDC level have a certain amount of their annual budget to spend on water supply systems in the different wards, the finances would be insufficient to provide community taps rather than a community well. Therefore community members in rural areas could be motivated to pay more for water access closer to their dwellings, instead of the community well, which is funded by the VDC.

#### 6.4.2. Social norms impact provision of services

As shown in section 4.4, Nepal lacks behind in almost all development dimensions. With a literacy rate at 48.6% (Nepal Census, 2001), implementing sanitation facilities is not merely a matter of providing the tools and techniques to construct toilets, but foremost training and education of people with a very low education level. Especially in rural areas, training materials have to be adapted to local circumstances and respect the low literacy rate. In addition, social norms might prevent people from lower casts to use the public taps. Similarly the 54% of the population without access to latrines, still practice open defecation. While providing support for toilet construction can improve health and hygiene for a household and the entire community, it is vital to understand the social norms between men and women. Women might not be allowed to use the same toilet as their father-in laws with whom they usually share the household. Thus health and hygiene training has not only to include basic information but also has to target the gender roles and perceptions of what is 'clean and dirty', 'appropriate and unacceptable'. Since women are concerned with water issues most of the time, its inalienable to include women in the WSUCs and especially because they are traditionally excluded from participating in such groups. Therefore providing water supply and sanitation infrastructure goes way beyond installation of services but offers a unique opportunity to carry out a development intervention with broad impacts on the community (see Pokhrel and Viraraghavan, 2004 and Busari, 2009).

#### 6.4.3 Fragmentation in water and sanitation sector

The water sector is very fragmented in Nepal. There are dozens of international actors improving access to water and sanitation in urban and rural areas. An unknown number of NGOs are hired to implement these projects in the communities. To make matter worse, there is hardly any coordination between the international, national and regional actors. Similarly the VDC and DDC do often lack overview about the number of NGOs operating in their area and what exactly their projects are aiming at. Thus projects are done simultaneously, in some cases even within the same VDC, tapping the same source, but without any coordination.

Instead of joining forces and investment, the WatSan actors are working independently from each other, with every single organization following different approaches, with different levels of community participation and different levels of subsidization. Confusion in the villages is large, preventing people from participating in a program that might have a lower subsidization level than other programs. Thus communities tend to adapt a 'wait and see' attitude. The lack of coordination results in resignation at the community level and in some cases community members wait for those projects with the highest amount of subsidies instead of improving the situation right away.

Although experiences among different organizations vary according to their approach and the community they target, there is no institutionalized exchange forum where all WatSan actors meet regularly. This leads to a multiplication of unnecessary negative experiences. Each organization adapts its own approach only where necessary, instead of learning from other programs and approaches. The lack of information and segregated information is also a major concern recognized by UN Habitat (2009).

#### 6.5. Future of Fund Board projects

In order to improve the projects of the Fund Board and to provide recommendations, there are some external issues influencing the future of the program. Additionally, the Fund Board

staff has already developed ideas to improve certain aspects in their approach for the coming batches, which are mentioned subsequently.

First of all, the Fund Board executive members and the task team leader of the World Bank are already familiar with concerns about financial maintenance. As the Fund Board has adopted its programs over the years to increase effectiveness, transparency and efficiency, there are also ideas how to improve sustainability of the schemes in terms of maintenance. The Fund Board is currently negotiating with an insurance company and with seven communities, which have just completed a project, about adopting insurance for the water supply system. This should ensure that funds for major rehabilitation are available in order to cover full or part of the scheme against damage caused by flood, landslide and/or earthquake. The Fund Board would only link the community with the insurance company but not provide the funds for insurance. Instead, each household would have to spend Rs. 3-5 per month in order to protect the water supply system from damage caused by natural hazards. The first negotiations have shown that the seven communities are very interested in adopting such insurance for their scheme, while at the same time some insurance companies are willing to provide a service at low cost.

The second important notion is that the Nepalese parliament is currently discussing whether the Fund Board should be incorporated as government organization. This means that the Fund Board would no longer operate independently but as part of a government department<sup>31</sup>. The World Bank indicated that the funding would continue under certain conditions even if the Fund Board were part of the government. This is a remarkable opportunity to mainstream the Fund Board experiences not only in rural water supply and sanitation but other sectors as well. As the Fund Board already plays a prominent role in drafting the national WatSan plan, the experience over 14 years of project implementation could be beneficial to improve government activities in the water and sanitation sector.

The last key issue is that the Fund Board plans to adapt a modality that increases accountability between stakeholders involved during a project. The idea is that community members are scoring performance of the WSUC members, the WSUC members the one from the SO and vice versa and report it to the Fund Board. As a result, the Fund Board would be immediately informed about any negative performance and could intervene faster. As Mansuri and Rao (2004) mention, downward accountability can enhance the sustainability of community-based development projects and would thus be a positive change to increase effectiveness and sustainability of Fund Board projects.

Keeping these three key aspects in mind, the Fund Board projects still have to improve certain procedures.

First of all, more coordination is needed with the VDC and DDC to increase local capacity, ownership and sharing of responsibility. Although, as discussed in the previous chapters, stronger involvement of local and regional government is necessary, this is extremely difficult in the Nepalese context, because of the weak political and human capacity at VDC, DDC level. Although the Fund Board policy emphasizes a regular contact with the local government, this is not exactly the case in practice. Similarly the Fund Board policy states that the water sources should be covered in order to provide the community members with drinking water, it was only partly the case in the three communities. Overall, there is a gap between what is defined on paper and what is actually implemented in practice. Although it is not necessarily on behalf of Fund Board only, that certain procedures are not complied with,

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<sup>31</sup> It is yet to define whether DWSS, DoLIDAR or a new government department would take over the Fund Board.



the SO and the SA can also be held more accountable if procedures are not followed or not sufficiently implemented.

Second of all, in order to improve maintenance, the post-implementation phase should last for more than two years. The VDC and DDC could be stronger involved during this phase; not only to ensure that responsibilities are shared, but this could also lower the cost in case of a major rehabilitation. Therefore local government can be held accountable for continuous provision of drinking water for its citizens if they are included at an early stage of the project and responsible for maintenance after project completion.

## 6.6. Conclusion

Concluding this chapter, positive and negative aspects were mentioned at the beginning, followed by linking the findings with the theories from chapter 2.

Numerous positive aspects of the Fund Board projects; the approach is inclusive and offers community members to link up with microcredit institutions, to establish regular contact to local NGOs and strengthens WSUC members capacity to manage and maintain the water supply system. Yet, the financial capacity to maintain the system needs to be reconsidered. In the end, the Fund Board projects are already well established but need overcome gaps between theory and practice and improve maintenance.

This chapter also summarized external aspects influencing water and sanitation projects. Various political and social factors influence at large how projects can be implemented. Thus there are clear boundaries to the extent that an NGO can collaborate with local, regional government. Unless social behavior and hierarchy is reflected during the project design, the outcomes might not reach the poorest and most marginalized groups of society. Finally, several actors, including UN Habitat, have noted fragmentation of the water supply and sanitation sector, thus an increased coordination can help to improve projects and spend resources in a more effective and efficient way.

The chapter ends with future prospects of the Fund Board and to what extent the recommendation of this study have already been incorporated. Whether the Fund Board will continue its projects as semi-autonomous organization or as part of the regular government department remains to be seen.

## 7. Conclusion

This last chapter summarizes the main objective and findings of this thesis. It also gives recommendations to improve activities for the Fund Board projects. Additionally, the SWOT analysis in this chapter summarizes the different aspects influencing the future of the Fund Board projects. Finally the chapter ends with some ideas for further research in order to improve programs in the water and sanitation sector in Nepal.

### 7.1. Research aim and findings

Access to water and sanitation are inalienable for human well-being. Nepal along with 121 other countries accepted the UN resolution, which acknowledges access to water and sanitation as a human right (UN, 2010). As Nepal is one of the most underdeveloped countries in South Asia, many people lack access to basic services such as water and sanitation. UN Habitat (2009) estimates that only a third and a fifth of the population has access to sanitation. The lack of access to water is less severe than sanitation; around 76% of the population is having access to water according to UN Habitat. In order to improve sanitation coverage and access to safe drinking water, the government and numerous INGOs and NGOs are implementing projects all over Nepal.

Often maintenance of water supply and sanitation systems is not institutionalized sufficiently; therefore sustainability of this infrastructure is challenged. In 22 hill districts in Nepal for example, only 21% out of 5000 water points are functioning as designed, 56% need major repair and 21% require complete rehabilitation (Bhattarai & Adhikari, 2009).

To understand what aspects influence sustainability of water supply and sanitation, this study focuses on one of the main actors specialized in rural water supply and sanitation, the RWSS Fund Board, which works through local NGOs directly with small communities all over the country. The Fund Board has implemented projects since 1996 in various districts all over Nepal. Three communities in Central and Western Nepal were included during research and several interviews were carried out with key stakeholders to learn about the project set-up, stakeholder involvement and the positive and negative aspects of the Fund Board projects.

The main research question guiding this study is as follows:

***What aspects influence the sustainability of Fund Board water and sanitation projects in rural communities in Western and Central Nepal?***

Looking at two villages in the Terai and one in the hilly areas, my research focuses on aspects that increase or diminish the sustainability of water supply and sanitation. Therefore it takes a closer look at the financial, social, health and hygiene, institutional, technical and environmental aspects influencing the respective projects sustainability.

Overall, the extent of community participation, project set up, gender and minority sensitivity, health and hygiene training and the financial contribution of the community, are all influencing a project's sustainability. The project design and implementation also influences whether the community members are using the facilities later and how the community organizes the maintenance. Regarding projects of the Fund Board, there are six particular statements that are concluded once more in this section.

First of all, the projects were clearly demand-driven and very participatory. Community participation, local-level planning during a project and community-based management of facilities are assumed to increase sustainability (World Bank, 2010; Doe & Kahn, 2004; Mansuri & Rao, 2004; Barrios, 2008). The Social Development and Research Center (SDRC)

in Goidakot worked closely with the Water and Sanitation Users Committees (WSUCs) in Sital Tole and Madhavpur second. Similarly the Nepal Red Cross Society (NRCS) in Damauli assisted the community in Chintutar during the project. The WSUCs were involved during every phase of the project, decided on technical options for water supply and sanitation and defined criteria to use the revolving fund, which was used to support toilet construction with loans. The remaining community members were involved during meetings and trainings, drafted the community action plans and constructed large parts of the water supply system. Participation of community and WSUC members was inclusive, women participated slightly more than men during the project and community members from marginalized groups had to be part of the WSUC, as stated by the Fund Board. So projects were demand-driven and participatory, which are two of the cornerstones to increase sustainability (see IWRM and World Bank, 2010).

Second, as a result of this gender/minority sensitivity, benefits from the projects were shared among all community members. Every household had equal access to the communal water tap in close proximity to the house at any point of the day. Also toilet coverage before the project very low in Sital Tole, moderate in Chintutar and Madhavpur second and increased significantly once the Fund Board project was carried out. Yet an indirect effect of having access to water and sanitation, was that health and hygiene of the community members and especially those of students improved. Additionally, since the communal taps were reachable within 15 minutes, girls and women, who are mainly responsible to fetch water, could save a lot of time. This gained time was either used for other household tasks or to do homework/study. However women were also encouraged to participate in the women's technical support service, which linked women with microcredit institutes and presented options for income generating activities. Overall social aspects such as equal access and equal benefits, the role of women in water management, participation of marginalized groups, time saving and the benefits derived from the project were found positive.

Third, since the support organization (SOs) work directly with communities, transparency is kept and the usually widespread corruption diminished. In order to keep expenditure transparent, the Fund Board established separate funds and paid the SO and the community only after the Service Agencies checked whether pre-defined targets were met. Although the local and regional government should be involved during the project, the co-ordination with VDC and DDC was kept minimal and challenges the financial sustainability of the water supply system. Therefore institutional set-up during the project was positive, however, to coordinate and institutionalize a relationship with the VDC and DDC needs to be improved.

Fourth, another core element to achieve sustainability is to establish sufficient funds to maintain the water supply system for the designed lifetime. Although Fund Board's incentives to establish an operation and maintenance fund were made, the amount of money is insufficient in case of a major breakdown of the water supply system. Additionally, the funds of Byas municipality, Pithuwa and Birendra Nagar VDC would neither be sufficient for a major repair in all three communities. So financial aspects largely influence whether the water supply system can be kept in place for the designed lifetime.

Fifth, although health and hygiene improved during the project, not all community members are using the toilets and still defecate near the jungle. Therefore, increased awareness training is necessary to improve sanitation condition in the communities; this could be supported with stronger involvement of the local schools during the Fund Board project. Students and the female Village Health Promoter could emphasize behavior change in the community and ensure that all household members are using their toilets. Although the low literacy rate among mothers might impact the effectiveness of health and hygiene training, ongoing awareness training is necessary to ensure community members change their behavior.

This observation links to another environmental issue, which impacts sustainability of the water supply system. Although the Fund Board policy states that water sources have to be covered, this is not the case in two communities. Besides that the water supply system significantly improves people's well-being, community members also stopped treating water before drinking after project completion. This would not be worth mentioning if the water source is covered and the quality of water good. However, in Chintutar and Sital Tole sources are not covered and contamination by animals and/or human activity is likely. So the health and hygiene training influenced the well-being of community members and at the same time, environmental aspects influenced health and behavior (water treatment). If benefits from using toilets and water from a tap decreases, it is more likely that people are not maintaining these facilities any longer and return to their traditional habits. So maintenance of these facilities is a trade off between receiving benefits and the costs for repair (see Busari, 2009).

Sixth, although the Fund Board approach does not explicitly mention a pro-poor policy, the poorest members of the community could profit during the project. When the community had to contribute a certain amount for upfront-cash, the poorest and ultra-poorest could opt to contribute in kind rather than in cash for the construction of the water supply system.

Moreover, while more poor and ultra-poor community members have access to their private toilet, the non-poor respondents are more likely to not have a private toilet. However, most poor households are using only temporary toilets. The structure and design of these temporary toilets is challenged by natural hazards, which can lead to collapse of the pit latrine. To ensure toilets are maintained it is vital for the entire community to support semi-permanent or permanent toilet construction. Occasionally, the poorest members received financial support to construct toilets. Still, the decision to provide a grant instead of a loan from the community revolving fund is left with the WSUC members. Still, not all WSUCs are able and willing to support poor community members in their attempts to build semi-permanent or even permanent toilets. Therefore more awareness building is necessary to ensure toilets are maintained, otherwise health and hygiene of the entire community is put at risk. So technical aspects determine the lifetime of toilets to a large extent. The construction of toilets also influences in the long run whether community members use this facility or not.

Finally the Fund Board projects can be seen as a successful development intervention in all three communities surveyed during this study. Access to water and sanitation improved daily life of people and is a pre-condition for a healthy living, improve quality of water, to decrease child mortality, decreases time to fetch water and contributes to economic development. Still, some aspects need to be improved in order to make projects more sustainable.

## **7.2. Challenges to improve water and sanitation coverage in Nepal**

There are numerous challenges hampering to achieve the MDGs in Nepal. Some of the issues raised in this section go beyond focusing on rural water supply and sanitation only.

First of all, the widespread poverty in Nepal makes many development interventions difficult. Low literacy rate, lack of infrastructure, little economic opportunities and basic services are missing in most parts of the country. When asking communities about their priorities, they would rather prefer agricultural roads than education, water supply/irrigation or a health post (see Barrios, 2008). Because many people are illiterate and have not an extended network to exchange information, their preferences can be strongly influenced by an external agency, which is planning to carry out a development intervention. This leaves room to potentially manipulate preferences of community members. Thus it is crucial to inform people in detail about the options available and what is most feasible at their state of development. Still, the final decision what is implemented is always a joint one. Development interventions should

always be more holistic rather than focusing only on infrastructure improvement; thereby taking into account various social, environmental aspects, focus on poverty alleviation and the consequences it might have for the community members.

Second, similar to Seppälä findings (2002) for most developing countries, water governance in Nepal is poorly co-ordinated. Political consensus and institutional change, the recognition and participation of all stakeholders and effective dissemination of information is necessary but poorly implemented. While cooperation between actors in water and sanitation is limited, little experiences are shared and important insights are kept within one organization. Additionally, the ongoing political struggle in Nepal challenges the cooperation with local/regional government officials. To make matter worse, those government officials in place are either not elected to be responsible for this particular post or are threatened by other political parties and have resigned recently. So responsibilities of VDC/DDC secretaries are often not taken care of.

Third, if an organization such as the Fund Board provides water and sanitation services to communities, the outcomes might be more promising than if services are provided by the state. Because the state has weak financial and human capacity, access to water and sanitation are insufficient. Therefore NGOs are often providing these services instead. This has some advantages: it is likely that the projects are more demand-driven, more funds are available, experienced engineers are assisting the communities to plan and construct the water supply facility and the service level is better, e.g. several communal taps instead of one dug well. Therefore many communities prefer being supported by NGOs and/or private companies to improve water supply rather than from the state. Besides these numerous advantages of an NGO involvement, if it comes to institutionalize the maintenance, NGOs often fail to provide ongoing financial support.

One possibility to ensure money for operation and maintenance is available, is to establish a community fund: each household has to pay a monthly water fee. However, this only works if all community members are involved during the project and comply with that agreement. Even if it is assured that the O+M fund is in place and the money sufficient for smaller repairs, sever damages by natural hazards can exceed the money available for repair. Therefore the community is usually unable to fully repair the system, because they lack funds and technical knowledge. Thus the implementing agency, be it the state or the NGO, is usually approached. In case of the Fund Board, there are no additional funds provided for such unexpected events, but the community together with the VDC has to bear financial responsibility. While the Fund Board states that the SOs should establish a continuous relationship with the government, this was hardly the case in the three communities. However, the weak level of coordination with local government is not an exception in the WatSan sector, most VDC and DDC secretaries do not even know how many NGOs are working in their area. Despite the NGOs they are familiar with, the VDC/DDC secretaries do not know the details of these NGO interventions. At the same time, NGOs working in one VDC do not know about other NGOs projects. Hence more coordination is needed with the VDC and DDC, thereby increasing local capacity, ownership and sharing of responsibility. Also increased coordination among INGO/NGOs would diminish project duplication and save time and resources.

Fourth, most approaches in the water and sanitation sector include to some extent participation and aim at being community-driven. Yet, participation has a variety of meanings and might look good on paper but does not need to be implemented properly in practice. Therefore a critical review of these concepts and a clear definition of what they actually mean in the field are necessary, to prevent unrealistic expectations if a project is evaluated.

Community participation is not the answer per se. Even when a project relies strongly on community participation, it does not have to be for the best of the poorest members. Because it is most likely that elites are participating the most, inequality might prevail, even after the

project (see Mansuri & Rao 2004). Keeping this tendency in mind, it is necessary to design community development projects according to the local context, with a long time horizon and a meaningful monitoring and evaluation system to learn from the experiences for future projects.

The fifth major challenge in the water and sanitation sector is the dire environmental condition of most urban areas. Environmental degradation is a major challenge for environmental sustainability in Nepal. Although Nepal is still a rural society, social transformation processes are shaping the future of urban areas. Many people migrate to escape from rural poverty to cities and municipalities; Water Aid expects an urbanization rate of 23% in 2016 (Rajbhandari, 2008). The water and sanitation condition in urban areas is totally different from the rural context. Water shortages, environmental degradation and malfunctioning waste treatment systems impact people's lives in urban areas. Additionally, pollution is increasing by increased traffic, industrial activities and lack of wastewater treatment. Although more people are aware of the increasing environmental degradation, there is too little action and commitment at the political level in general and civil society in particular to overcome this problem.

Most people in rural and urban areas throw garbage behind their house or on the streets, assuming its biodegradable. Thus public consciousness about different types of waste has yet to be developed and a number of public campaigns are necessary to raise awareness and increase people's environmental consciousness.

In rural areas in contrast, waste treatment is not such a pressing issue. The amount of non-organic waste is relatively small. Still, not all people are aware of waste cycle and how their waste behavior can affect the quality of water they consume every day. As a consequence, implementing water and sanitation projects always has to be accompanied by sanitation training, health and hygiene education and needs to include gender (and minority) aspects. Questions of ownership, responsibility and compliance are different according to the rural or urban context. Therefore development interventions have to be adapted according to the local circumstances; there is no blueprint for such interventions.

### 7.3 SWOT Analysis

This section summarizes strengths and weaknesses of the Fund Board projects and lists additional external aspects influencing the projects sustainability in a SWOT analysis. As mentioned earlier, the main goal of this study is to analyze what aspects lead to sustainable water and sanitation infrastructure in rural communities implemented by the Fund Board.

**Table 27: SWOT analysis**

<b>Strengths</b>	<b>Weaknesses</b>
<ul style="list-style-type: none"> <li>• Demand-driven development intervention</li> <li>• Includes minorities and is gender sensitive</li> <li>• Participation of WSUC and community members is extensive</li> <li>• Empowers women to use their time gained for income generating activities</li> <li>• Benefits are shared equally among community members</li> <li>• Improves health and hygiene thanks to provision of water &amp; sanitation and health &amp; hygiene training</li> <li>• Community contribution increases ownership</li> <li>• Financial transparency</li> </ul>	<ul style="list-style-type: none"> <li>• Financial maintenance is challenged by insufficient funds for major repair</li> <li>• Gaps between phases, leave SO without payment and no activities in communities</li> <li>• Low cooperation with local regional government</li> <li>• Some sources are uncovered and likely to be contaminated</li> <li>• Unwilling WSUC to support poorest in up-grading their temporary toilets</li> </ul>
<b>Opportunities</b>	<b>Threats</b>
<ul style="list-style-type: none"> <li>• Fund Board could be part of a government department</li> <li>• World Bank will continue funding regardless whether Fund Board is independent or not</li> <li>• Adaptations of Fund Board approach are planned and continue improving projects</li> <li>• Peace process and stable government could facilitate project implementation and to work with VDC, DDC</li> <li>• Economic development in Nepal, decreased poverty</li> <li>• Increased school enrollment</li> </ul>	<ul style="list-style-type: none"> <li>• Implementation of projects insufficient (e.g. no source coverage, low cooperation with VDC, DDC etc.)</li> <li>• Domination of elites in WSUC</li> <li>• Traditional marginalization of women and people from low casts in society</li> <li>• Inefficiency to hire 200 SOs with few projects</li> <li>• Little co-ordination in water &amp; sanitation sector with other NGOs/INGOs</li> <li>• Political instability</li> <li>• Population growth</li> <li>• Environmental degradation, climate change</li> </ul>

#### 7.4. Further remarks for research

For future research it is advisable to focus on programs in the water and sanitation sector lacking in-depth evaluation studies. For example, the Fund Board hires consultants to evaluate 30 projects implemented in a batch in order to make a meaningful comparison and to adapt their program accordingly. Therefore this study merely underlines the core issues challenging sustainability of Fund Board projects in rural areas, but does not uncover any unknown or surprising details. Although it does no harm to have an additional academic evaluation, it would be better if research topics, scope and use could be defined prior to the internship.

Nevertheless the research period and the process of writing the thesis proved to be very insightful in understanding the challenges of the water and sanitation sector in the context of Nepal. For future research on water and sanitation in Nepal, it would be interesting to look at education programs at schools and whether they are effective to achieve total behavior change in a community.

Another interesting aspect would be to compare pro-poor or gender policies, their implementation and effect in the field between different organizations. This would provide insights in how best to achieve inclusion of marginalized groups.

Today, there are a variety of organizations working to improve water and sanitation coverage, each with a unique planning approach. However, it is unknown to outsiders, which aspects work to include marginalized groups and which ideas are less useful in practice. Thus future research should compare such policies and give recommendations on how inclusion and participation of formerly marginalized groups is best ensured.

## 7.5. Final conclusion

Finally this chapter concludes the thesis with a summary of the main findings and conclusions drawn from both field-research and academic discussion. The major challenges to improve coverage in water and sanitation are emphasized once again in this chapter. Also strengths, weaknesses, opportunities and threats are summarized in a SWOT analysis. Finally this chapter gives some food for thought for avenue research during future IDS internships in Nepal.



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## 9. Annex

### Detailed research questions

- How is the target community involved during a FB project?
- How is the WSUC involved during the FB project and what decisions are made by them?
- What is the role of the school during the project?
- To what extent are VDC and DDC involved during the project and how?
- Who is responsible to operate and maintain the water supply system?
- Who does the community contact if there is a problem with the water supply system?
- Is the SO still in contact with the WSUC after project implementation?

### Social

Are all community members benefitting from the project?

- What is the impact of the project on the poorest of the community?
- Is the Fund Board approach pro-poor?
- Are communities capable to make informed choices about the water and sanitation system?
- On which aspects of the project features did the community decide?
- Are educational programs from FB or other organizations used at the school?
- Are men and women participating equally during the project?
- How does the household use the time saved to collect water?

### Financial

What is the financial contribution from different stakeholders (community, FB, SO, VDC, DDC) for the water and sanitation system?

- Which mechanism is used to install and maintain the water system?
- What is the financial mechanism for toilet construction?
- Is the operation and maintenance fund sufficient if there is a major breakdown in the water supply system?
- How many community members received a subsidy for toilet construction?

### Environmental

What is the environmental condition in the village?

- What is the condition around the water source, the intake and the taps?
- Do all households have toilets and are they using them?
- What is the condition of the toilets, are there any problems?
- How is the toilet waste managed?
- How is organic and inorganic waste managed?
- Has the community a waste collection system?
- How are animals kept and their waste managed?
- What needs to be done to improve sanitation condition in the village?

### Health and hygiene

What are the major impacts of the water supply system and toilets on the daily life of people?

- To what extent are health, hygiene and living conditions improved after the project?
- When do people wash hands?
- Do people treat water before drinking and how?

### Technical

Is the water and sanitation system technically sustainable?

- Is there sufficient water for all community members at any time?
- How many households are sharing one tap?
- Is the water quality sufficient for drinking?
- Is the water supply system technically sound and feasible for the needs in the community?
- Which types of toilets are presented by the SO?
- Why are particular options for toilets selected?
- What are the types of toilets constructed in the village?
- Is there any problem with the toilets so far?

#### General

- Who initiated the project, is the approach demand driven?
- How can the activities by the SO be improved?
- What are the major challenges and drawbacks of FB projects?
- How can FB projects be improved?

The questionnaire for the household survey is included next. The questionnaire in Nepali or any additional questions can be obtained from the writer.  
[giulietta.buddeke@gmail.com](mailto:giulietta.buddeke@gmail.com)

# RWSS Fund Development Board

## Household Survey

### Informed Consent and Cover Page

Namaskar,

My name is ..... and I am taking household surveys here on behalf of a research study which is being conducted in collaboration with UN-Habitat, on the water and sanitation project that was implemented in ..... by ..... I would like to ask you some questions about the water and sanitation situation of your household, about participation in the project, and the impact of the project in your household.

The information you give will be used to evaluate this project, and for the thesis of students. The information can furthermore be used to make future projects better. We are not interested in receiving any particular answers, only answers that represent your opinion. We hope that you will answer these questions as honest and complete as possible.

I would like to emphasize that any information you give will be processed anonymously and no personalised data will be handed over to local authorities – or other authorities. We guarantee that your privacy will be protected.

If you have any questions about the survey, you can ask me, our survey field supervisor who is here with the survey team or the staff of UN Habitat (UN-HABITAT, P.O. Box 107 Pulchowk, Lalitpur, NepalTel: + 977 1 5542816). At this time, do you have any questions about the survey?

Village: .....

Household no. ....

Signature of interviewer:.....

Date:.....

Field Supervisor: .....

Data entry Operator: .....

### 1. Structure of house

1.	Is the respondent female/male?		.....												
2.	What is the respondent's relationship to head of house		.....												
3.	Number of household members sharing common kitchen?														
4.	What is the age of household members		<table border="1"> <thead> <tr> <th></th> <th>Female</th> <th>Male</th> </tr> </thead> <tbody> <tr> <td>Less than 16 years</td> <td></td> <td></td> </tr> <tr> <td>More than 16 but less than 60 years</td> <td></td> <td></td> </tr> <tr> <td>More than 60 years</td> <td></td> <td></td> </tr> </tbody> </table>		Female	Male	Less than 16 years			More than 16 but less than 60 years			More than 60 years		
			Female	Male											
		Less than 16 years													
		More than 16 but less than 60 years													
More than 60 years															
5.	How many years has your family lived in this house?		1. less than 1 years 2. more than 1 year but less than 5 years 3. more than 5 years												
6.	What is the type of construction of the house?		1 Permanent 2 Semi permanent 3 Temporary												
7.	Number of floors (including ground floor)		.....												
8.	What is the type of roof?		1. Concrete roof 2. Pewter/Zinc roof 3. Tile roof 4. Thatch roof 5. Others												

9.	What is the main sources of livelihood for the family?		Activities	Most important ..... Second most important ..... Third most important .....
			1 farming 2 livestock raring 3 own business 4 Job 5 Foreign employment 6 Wages (Agriculture or Construction) 7 Remittances 8 Government support (pension, disability support, NGO support) 9	

## 2. Information about family members

10.	Where are you and the members of your household working? List the number	No.	Place
			1 This village
			2 Neighbouring village
			3 Nearby town
			4 Kathmandu metropolitan area (KTM, Patan)
			5 Outside KTM Valley, inside Nepal
	6 Outside Nepal		
11.	How much does your household spend every month (food, school fees, water fees, clothes, medicine and others)	Rs.....	

## 3. Economic status

12.	How many rooms does your family use?	.....
13.	Do you have a separate kitchen?	1 <input type="radio"/> Yes 2 <input type="radio"/> No
14.	What is the place for washing dishes?	1 <input type="radio"/> Full plumbed kitchen 2 <input type="radio"/> Tap at shorter height (for washing dishes inside kitchen) 3 <input type="radio"/> No tap for washing dishes 4 <input type="radio"/> Place for washing dishes with tap outside kitchen 5 <input type="radio"/> Place for washing dishes without tap outside kitchen 6 <input type="radio"/> No place for washing dishes (bucket used).
15.	Which type of fuel do you use for cooking?	1 <input type="radio"/> Gas 2 <input type="radio"/> Biogas 3 <input type="radio"/> Electricity 4 <input type="radio"/> Kerosine 5 <input type="radio"/> Woods 6 <input type="radio"/> Straw 7 <input type="radio"/> Other, please specify

## 4. Access to water

16.	<p>What are the different sources of drinking water that your household uses?</p> <p><i>Please list all sources used for drinking water and sources used for other purposes. A private tap is a tap connection on the plot of the house that is connected to the central system.</i></p>	<b>Sources:</b>		<b>Before project</b>		<b>After project</b>	
				<b>Purpose</b>		<b>Purpose</b>	
		1.	Yes	Drinkin	othe	Drinkin	Othe
		2.	No	g	r	g	r
		1	Private tap				
		2	Neighbour's tap				
		3	Community Dug well				
		4	Community stand post				
		5	Spring water				
6	River/stream						
7	Tube well						

		8	Pond				
		9	Stone spout				
		10	Rain water				
		11	Other, specify				
17.	Is the amount of water your household uses enough for your household?	Before project		After project			
		1 <input type="radio"/> Mostly enough 2 <input type="radio"/> sometimes enough, sometimes not enough 3 <input type="radio"/> Mostly not enough 4 <input type="radio"/> Don't know / no answer		1 <input type="radio"/> Mostly enough 2 <input type="radio"/> sometimes enough, sometimes not enough 3 <input type="radio"/> Mostly not enough 4 <input type="radio"/> Don't know / no answer			
18.	What is your opinion about the water quality [main source of drinking water]	1 <input type="radio"/> Very good 2 <input type="radio"/> Good 3 <input type="radio"/> Not good, not bad 4 <input type="radio"/> Bad 5 <input type="radio"/> Very bad 6 <input type="radio"/> Don't know/ no answer		1 <input type="radio"/> Very good 2 <input type="radio"/> Good 3 <input type="radio"/> Not good, not bad 4 <input type="radio"/> Bad 5 <input type="radio"/> Very bad 6 <input type="radio"/> Don't know/ no answer			
19.	Does your household treat your drinking water in any way to make it safer to drink (quality)?	1 <input type="radio"/> Always 2 <input type="radio"/> Often 3 <input type="radio"/> Sometimes 4 <input type="radio"/> Hardly ever 5 <input type="radio"/> Never		1 <input type="radio"/> Always 2 <input type="radio"/> Often 3 <input type="radio"/> Sometimes 4 <input type="radio"/> Hardly ever 5 <input type="radio"/> Never			
20.	What do you usually do to the water to make it safer to drink?	1 <input type="radio"/> Boiling 2 <input type="radio"/> Chlorination 3 <input type="radio"/> SODIS 4 <input type="radio"/> Filter 5 <input type="radio"/> Hankerchief 6 <input type="radio"/> Other, specify...		1 <input type="radio"/> Boiling 2 <input type="radio"/> Chlorination 3 <input type="radio"/> SODIS 4 <input type="radio"/> Filter 5 <input type="radio"/> Hankerchief 6 <input type="radio"/> Other, specify...			
21.	How much time did your family spend to collect water (for drinking and other purposes) before the project, and after the project? <i>Please give a daily average in minutes (time to get to source, get water, and come back).</i>	Before project	After project	1. less than 15 min 2. 15- 30 min 3. 30 min – 1 hr 4. more than 1 hr 5. no change in time			
22.	<b>If household spends less time collecting water since the project</b> How does your household spend the time that is saved in collecting water?	1 Other household tasks 2 Family tasks 3 Income generating work (weaving mats and weaving clothes, poultry etc) 4 School/study 5 Leisure 6 Other, specify.... 7 Don't know / no answer					
23.	How much water does your household use compared to before the project?	1 <input type="radio"/> Much more 2 <input type="radio"/> Little more 3 <input type="radio"/> The same 4 <input type="radio"/> Little less 5 <input type="radio"/> Much less 6 <input type="radio"/> Don't know / no answer					
24.	Is the [main source of drinking water] available every day of the year?	1 Yes 2 No					
25.	How many hours a day is water available at the tap for your household [main source of drinking water]	1. 1-3 hrs 2. 3-6 hrs 3. 24 hrs 4. Every alternate days					
26.	Do you think other households get more water than your household?	1. Yes, they get more 2. No, it is equal 3. No, our household gets more					



27.	Are there any problems by sharing the same tap?	<ul style="list-style-type: none"> <li>1 No</li> <li>2 Yes, surroundings of tap is dirty</li> <li>3 Yes, I have to wait in line</li> <li>4 Yes, I don't get enough water</li> <li>5 Others, specify</li> </ul>
28.	What is your opinion about the fee for operation and maintenance of the water supply system?	<ul style="list-style-type: none"> <li>1 <input type="radio"/> Very high</li> <li>2 <input type="radio"/> High</li> <li>3 <input type="radio"/> Fair</li> <li>4 <input type="radio"/> Low</li> <li>5 <input type="radio"/> Very low</li> <li>6 <input type="radio"/> Don't know / no answer</li> </ul>
29.	I would like to know how satisfied you are with the water services that were brought by the project.	<ul style="list-style-type: none"> <li>1 <input type="radio"/> Very satisfied</li> <li>2 <input type="radio"/> Satisfied</li> <li>3 <input type="radio"/> Not satisfied, not unsatisfied</li> <li>4 <input type="radio"/> Unsatisfied</li> <li>5 <input type="radio"/> Very unsatisfied</li> <li>6 <input type="radio"/> Don't know / no answer</li> </ul>

## 5. Environmental sanitation (access and technology choice)

30.	Do you have a toilet at your home?	1. Yes	2. No
31.	Where did your household go for toilet before the project? And after the project?	Before project <ul style="list-style-type: none"> <li>1 Private toilet</li> <li>2 Shared toilet with neighbours / family</li> <li>3 Community toilet</li> <li>4 Open field/ river</li> <li>5 Other, specify....</li> </ul>	After project <ul style="list-style-type: none"> <li>1. Private toilet</li> <li>2. Shared toilet with neighbours / family</li> <li>3. Community toilet</li> <li>4. Open field/ river</li> <li>5. Other, specify....</li> </ul>
32.	What is the reason behind <b>not</b> building your own toilet?	<ul style="list-style-type: none"> <li>1. A forest/river is nearby</li> <li>2. There is no proper place to build one</li> <li>3. I do not want to use a toilet</li> <li>4. Too expensive</li> <li>5. Have another toilet available</li> <li>6. Others...</li> </ul>	
33.	<b>If private toilet</b> - Which type of toilet did your family use before the project? And after the project?	<ul style="list-style-type: none"> <li>1 ECOSAN</li> <li>2 Pit latrine</li> <li>3 Double pit latrine</li> <li>4 Private septic tank</li> <li>5 Community septic tank</li> <li>6 Cistern flush toilet</li> <li>7 Pour flush toilet</li> <li>8 Field</li> <li>9 attached to biogas</li> </ul>	<ul style="list-style-type: none"> <li>1. ECOSAN</li> <li>2. Pit latrine</li> <li>3. Double pit latrine</li> <li>4. Private septic tank</li> <li>5. Community septic tank</li> <li>6. Cistern flush toilet</li> <li>7. Pour flush toilet</li> <li>8. Field</li> <li>9 attached to biogas</li> </ul>
34.	Who suggested you to build the above toilet?	<ul style="list-style-type: none"> <li>1. It is my own vision</li> <li>2. I saw one at my neighbours</li> <li>3. SO suggested it</li> <li>4. Others.....</li> </ul>	
35.	How do you manage the waste from your toilet?	<ul style="list-style-type: none"> <li>1. I dispose it directly to sewer line</li> <li>2. I dispose it to the septic tank which is connected to the sewer line</li> <li>3. I dispose it in the septic tank outside the house.</li> <li>4. I dispose it in the pit</li> <li>5. Others.....</li> <li>6. Not emptied yet, no problems.</li> </ul>	
36.	Are you facing any problems in your toilet?	<ul style="list-style-type: none"> <li>1. Drainage problems</li> <li>2. It gets filled too soon</li> <li>3. It smells very foul</li> <li>4. Toilet needs repair</li> <li>5. I have problems during monsoon months.</li> <li>6. No problems</li> </ul>	

		7. Others.....
37.	In your opinion who has had final voice in the decision about the type of toilet?	1. Me/my household 2. WSUC / project 3. SO 4. Village Development Committee (VDC) 5. Other(s) from outside the village, specify..... 6. Don't know/no answer
38.	What options for toilet were presented by SO before constructing one?	1. No, only one option was discussed 2. Yes, several options were presented, namely a) ECOSAN b) Pit latrine c) Double pit latrine d) Pit latrine attached to biogas e) Private septic tank f) Community septic tank g) Other, specify.... 3. Don't know
39.	Did you receive any subsidy from the project?	1. In cash.....rupees 2. Received construction materials (pipe, pan, cement) 3. No subsidies received.

### Solid waste and grey water management, sanitization

40.	Where do you dispose the organic wastages (vegetable wastages/kitchen)?	1. Dispose it in the garden 2. Dispose it in the road 3. Give it to the domestic animals like Chicken, dogs, cows as food 4. Dispose it in the pit 5. Others.....
41.	Where do you throw the inorganic waste such as plastics, glass?	1. Burn it 2. Dispose it in the river 3. Dispose it in the (communal) dumping area 4. Recycle it 5. Others...
42.	I would like to know how satisfied you are with the sanitation services that were brought by the project.	1 Very satisfied      2 Satisfied      3. Not satisfied, not unsatisfied 4 Unsatisfied      5 Very unsatisfied      6 Don't know / no answer
43.	During the project did you or members of your family participate in any health and hygiene activities?	1. Yes 2. No
44.	How satisfied are you with the information provided on health and hygiene by SO?	1 Very satisfied      2 Satisfied      3. Not satisfied, not unsatisfied 4 Unsatisfied      5 Very unsatisfied      6 Don't know / no answer
45.	Do you know about any current sanitation activities in your community?	1. Yes 2. No
46.	What should be done to improve the sanitation situation in your community?	1. Increase awareness programmes 2. Increase number of toilets 3. Introduce proper solid waste management system 4. Develop wastewater treatment facilities 5. Make proper rules and regulations

6. Others.....

## 6. Health and hygiene

47.	Has there been a change in the general health of your family since the project?	1 O Much better health 2 O Little better health 3 O Not better, not worse 4 O Little worse health 5 O Much worse health 6 O Don't know / no answer															
48.	Has there been a change in the incidence in the following diseases in your household since the project? <i>Please write the number from the list on the right</i>	<table border="1"> <tr> <td>Disease</td> <td>Incidence</td> </tr> <tr> <td>Diarrhoea</td> <td></td> </tr> <tr> <td>Eye and Skin infection</td> <td></td> </tr> <tr> <td>Typhoid</td> <td></td> </tr> <tr> <td>Dysentery</td> <td></td> </tr> <tr> <td>Worms</td> <td></td> </tr> </table>	Disease	Incidence	Diarrhoea		Eye and Skin infection		Typhoid		Dysentery		Worms		1 Much more often 2 Little more often 3 Not more, not less often 4 Little less often 5 Much less often 6 Don't know / no answer		
Disease	Incidence																
Diarrhoea																	
Eye and Skin infection																	
Typhoid																	
Dysentery																	
Worms																	
49.	<b>If no toilet is used go to 52</b> Is the toilet clean? (make observations)	1. Yes 2. No															
50.	What material was used to construct the entire toilet? (make observations and photo)	1 Pan 2 Pipe 3 Cement 4 Brick 5 Wood 6 Bamboo 7 Plastic 8 Clay	9 Mud 10 Sand 11 Gravel 12 Stones 13 Iron rod 14 others, specify	1 Permanent substructure and superstructure (1,2,3,4) (12,13...) 2 Permanent substructure and temporary superstructure (1,2,3,4) (7,9,12) 3 Temporary substructure and superstructure (5,6,7,8,9,10,11)													
51.	Do you put on slippers before you enter in the toilet?	1. Yes I do 2. Sometimes I do 3. No I don't															
52.	If yes, then why?	1. To protect our feet from dirt and germs 2. To prevent suffering from diseases 3. Others.....															
53.	At what times do you wash your hands?	1. Before having food 2. After having food 3. After defecation 4. After coming in contact with wastages 5. Others.....															
54.	After defecation, what do you wash your hands with?	1. Water only 2. Soap and water 3. Ash and water 4. With clay 5. Others.....															
55.	After you clean your baby's excreta, what do you wash your hands with?	1. Water only 2. Soap and water 3. Ash and water 4. With clay 5. Others..... 6. No baby															
56.	Where do you take your baby for defecation?	1. In plain land	2. In the toilet	3. In the Garden													
57.	Where do you dispose your child's excreta?	1. In the toilet 2. There is no any particular place															
58.	Where do you throw the wastewater after you wash dishes?	1. Dispose it in the garden/near tap 3. There is no particular place		2. Dispose it in a pit 4. Others.....													
59.	Where do you keep your domestic animals	1. Indoors	2. Outdoors	3. No animals													

60.	How do you manage the excreta of the domestic animals?	1. Make compost out of it 2. Dispose it outside the house 3. Use it to prepare dried cow dung 4. Others.....
61.	In the past year did you and your family suffer from the following diseases?	

Diseases	<5 years baby	5 years above (Adults)
1. Simple Cough		
2. Diarrhea		
3. Typhoid		
4. Cholera		
5. Pneumonia		
7. Ascaris/Worm		
8. Jaundice/Hepatitis-A		
9. Dysentery		
10. Trachoma		
11. Scabies		
13. Other.....		
14. Other.....		

## 7. Water and Sanitation Users Committee

62.	Do you know about the WSUC	1 Yes 2 No
63.	Were you asked to participate in the WSUC?	1 Yes 2 Yes, but I was not able to join, because ..... 3 No
64.	Are you informed about what happens at committee meeting?	1 Yes 2 No
65.	Before construction, were you asked to choose who would be responsible for operation and management of the water system?	1 Yes, I was asked 2 No, I wasn't asked 3 No answer / I don't know
66.	In your opinion how much does the WSUC/project take care of the problems in water and sanitation?	1 Very much 2 Much 3 Not much, not little 4 Little 5 Very little 6 Don't know / no answer
67.	Do you think the WSUC/VMW is able to maintain and operate the water system?	1 Very much 2 Much 3 Not much, not little 4 Little 5 Very little 6 Don't know / no answer
68.	Can you please explain why you think the WSUC is not able of maintaining and operating the system?	1 Lack of technical knowledge 2 Lack of material/equipment 3 WSUC lack responsibility 4 WSUC is corrupt 5 WSUC has too little money 6 WSUC don't address the demand directly 7 others
69.	Who would you contact if there is a problem with the water system?	1 WSUC/ Village Maintenance Worker 2 SO 3 VDC 4 my neighbours, friends 5 no one 6 others ....

## 8. Participation and decision making

70.	Did you or any members of your household attend any meeting about the water and sanitation project?	1 Yes 2 No 3 Don't know / no answer
71.	How often?	.....
72.	Was it mostly male or mostly female members of your household that went to the meetings?	1 Only male 2 Mostly male 3 Male and female evenly 4 Mostly female 5 Only female 6 Don't know / no answer
73.	Why did you or your family member(s) attend these meetings?	1 I/we were interested 2 Were asked to attend 3 Were obliged to attend 4 Other, specify..... 5 Don't know / no answer
74.	Did you take part in decisions that were made about the water and sanitation project in your village?	1 Very much 2 Much 3 Not much, not little 4 Little 5 Not at all 6 Don't know / no opinion
75.	Before construction, on which aspect did you have the most influence?	1 Project management (WSUC) 2 Type of toilets 3 Private taps 4 Household contribution 5 Prices for water 6 Prices for sanitation 7 No influence on any 8 Other, specify..... 9 Don't know/no answer
76.	In your opinion, do feel your voice has been respected by the project?	1 Very much 2 Much 3 Not much, not little 4 Little 5 Very little 6 Don't know / no opinion
77.	Could you please tell me the aspects of the project did your family get benefited from?	1. Private toilet 2. Pavement repairment with bricks 3. Private tap 4. Well repairment 5. Surface drainage 6. Sanitation 7. Employment 8. Others.....

## 9. Project contribution

78.	Have any members of your household been in any of the user (sub) committees or community groups?	1 <input type="radio"/> Yes 2 <input type="radio"/> No 3 <input type="radio"/> Don't know / no answer																				
79.	please fill in table  <i>Instructions for filling in table:</i> Who: sister, husband, son... How long: in years	<table border="1"> <thead> <tr> <th>Who?</th> <th>Name of committee/group</th> <th>How long?</th> <th>Ongoing?</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	Who?	Name of committee/group	How long?	Ongoing?																
Who?	Name of committee/group	How long?	Ongoing?																			

	Ongoing: Yes / No			
80.	How much money did your household pay for the installation of water system (upfront cash)			
81.	How much money does your household pay for water every month?	Rs.....		
82.	Was it difficult for your household to obtain the money for installing the water system?	1 <input type="radio"/> Very difficult 2 <input type="radio"/> Difficult 3 <input type="radio"/> Not difficult/ not easy 4 <input type="radio"/> Easy 5 <input type="radio"/> Very easy 6 <input type="radio"/> Don't know / no answer		
83.	How much did your household invest for the toilet?	Rs.....		
84.	Was it difficult for your household to obtain the money to install the toilet?	1 <input type="radio"/> Yes 2 <input type="radio"/> No 3 <input type="radio"/> Don't know / no answer 4 <input type="radio"/> Comment.....		

**End**

85.	To what extent do you feel that your family has benefited from the project compared to other families?	1 <input type="radio"/> My family benefited more than other families 2 <input type="radio"/> My family benefited equally as other families 3 <input type="radio"/> My family benefited less than other families 4 <input type="radio"/> Don't know / no answer
86.	Do you have anything else that you would like to add, or that you feel has been left out of this survey? Feel free to make any remarks or comments.	..... .....

At last, thank you for our patience and the information you provided will be valuable for my research. Therefore, I am very grateful to you.