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Opportunities and Challenges of the Larger-Scale Water Supply Project: Insights from the Kavre Valley

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SUMMARY

This chapter documents the experience of the development of large-scale inter-municipality water supply project in Kavre valley, including three municipalities of Dhulikhel, Banepa and Panauti. The Kavre Valley Integrated Water Supply Project (KVIWSP) initiated in 2013 is about to complete and there are ongoing negotiations to agree on the governing mechanisms. While the new project provides a cost-effective solution to growing water problem of the towns, as the authors maintain, there are a mountain of challenges. As we argue in this chapter, there involves a daunting task of negotiating water sources with upstream community to ensure the reliable supply of water. Besides, other challenges related to the management of such a large-scale project include: payback of loan to the donor (Asian Development Bank), governing mechanism including three municipalities and technical and management related challenges for effective functioning of the project. This chapter signals a clear message that while large scale projects are required for addressing increasing urban water demand in the lower Himalayan towns, we should not undermine the importance of smaller scale community-based schemes which play a vital role in ensuring equitable and sustainable water supply.

1. INTRODUCTION

Towns are not livable without ensuring reliable access to safe drinking water for the residents. Nevertheless, urbanizing areas in the Global South are having tough times managing water due to growing population, changing livelihood practices in tandem with climate change impacts (Manouseli et al., 2019). The experience of the rapidly growing hilly towns of Nepal is not different from other towns in the Himalayas (Bajracharya et al., 2019). As the existing water sources are depleting, these hilly towns are facing considerable challenge of meeting the increasing water demand. Estimate suggests that only about 87% population in urbanizing areas have access to municipal water supplies (DWSS, 2018). Consequently, the majority of poor people of both rural and urban areas are more likely to use the water from unimproved sources such as ponds, wells and streams, which may cause water borne diseases (Budhathoki, 2019).

Acknowledging water access as a basic human right, government of Nepal has given a top priority to water supply and sanitation services. Along with this line, large-scale water supply projects are being planned across the country with an intention to connect each household with pipe networks. However, such large infrastructure projects are not only costly and but also poses several social and environmental challenges (MWSS, 2016). Given the high investment and technical capacities needed, these projects are funded by external donors (Kovacs et al., 2019). Though the financial and technical (engineering) are the visible aspect of such large-scale water projects, significant effort is needed on invisible yet daunting task of the consensus building and negotiations on securing water within and between river basins before even visioning of such project. Securing water sources and maintaining the sustainable supply appears the key to such large-scale projects (Bhatta et al., 2014; Joshi et al., 2020).

This chapter presents an overview of individual as well as collective initiatives of the three municipalities – Dhulikhel, Banepa and Panauti of Kavre valley to develop consensus for the large-scale project and materialize it. While the large-scale projects are vital to

meet the growing water need of emerging towns, it involves daunting task of negotiations. There involved negotiations not only with upstream communities to serve the water sources but also among municipalities to agree on the governance mechanisms. As we elaborate in this chapter, large-scale projects have merits in terms of cost-effectiveness and reaching to larger populations, there involve mountain of challenges.

This chapter is based on the decade long knowledge and experience of the lead author who is district level journalist and the engagement and reflection of the researchers from Southasia Institute of Advanced Studies (SIAS) working on the issue of water security in Kavre Valley. The primary information was also collected through 14 key informant interviews with people involved in negotiating and implementing the project including mayors and deputy mayors of three municipalities, representatives of different water users' committees in the towns and the representatives from upstream community.

In the following sections, we captured the existing water management strategies of Dhulikhel, Banepa and Panauti municipalities and their struggle towards water security. In the section 3, we present the collective effort of these three municipalities in agreeing on the KVIWSP project and materializing it. This section also discusses the challenges and opportunities associated with the KVIWSP. Finally, we conclude the chapter indicating the ways forward.

2. WATER MANAGEMENT IN THREE TOWNS

Banepa, Panauti and Dhulikhel of Kavre valley are urbanising rapidly as a touristic, medical and educational hub. The valley comprises of three major towns i.e. Dhulikhel in the east, Banepa in the center and Panauti on the south. The land use map of Kavre valley shows that the settlement area has been increasing visibly.

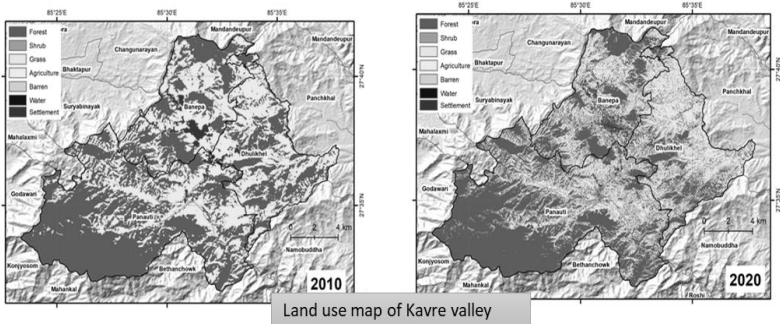


Figure 1: Land use map of Kavre valley

These towns were declared as municipalities at different years¹ and accordingly the development stages of water supply system within each municipality varies. However, all of them struggled to secure water supply.

Dhulikhel has troubling history of urban water management and in recent years (post-1990), it has been well-known for community-based water management. Dhulikhel Drinking Water and Sanitation Users Committee (DDWSUC), has been managing water supply through the plant established with German Development agency (GTZ) support. Dhulikhel negotiated a water sharing agreement with the upstream village of Bhumedanda (currently under the Panauti Municipality) to ensure reliable water supply. History and struggle of Dhulikhel in urban water management is captured in the previous chapter (see Chapter 2 of this book by Byanju et al., 2021). Here we provide more attention on how Banepa and Panauti have been managing water supply.

The journey of water management of Banepa, in its initial phase, resembles that of Dhulikhel. It starts with the historic tap, Hari Amrit Dhara initiated by Hari Samsher, the community leader then in 1941. The town then stepped towards the first piped water supply system of Dhaneshwor Water supply project. Managed by Nepal Water Supply Cooperation (NWSC), the system relied on the water source located at Dhaneshwor Khola (MoUD, 2013). As the demand

1 Banepa, Dhulikhel, and Panauti were declared as municipalities in 1982, 1986 and 1997 respectively

grew over time, in the early 1970s, the local authority, i.e. Kavre District Panchayat, initiated the extension of the existing system. However, the extension was an arduous task, as it needed new water sources. The then Chairperson of Kavre District Panchayat, who was also an inhabitant of Banepa, along with other community leaders made significant efforts to build consensus with Devitar Panchayat (present ward no. 3 of Banepa) where the new source of water was identified. They made several rounds of meetings not only with the community of Sasipani village where the major source of water was located but also with other adjacent villages – Anekot and Jaisithok. The major concern of these upstream communities was to ensure their own irrigation needs. In 1972, with the assurance that the water will be diverted to Banepa without compromising the domestic and irrigation needs of Devitar, the community agreed to provide water to Banepa. This agreement led to the initiation of Sasipani Water Supply Project in 1972 that completed in 1976 with the support from the Department of Water Supply and Sewerage (DWSS).

Since Banepa was rapidly growing as a market center so the water supply was still inadequate to meet the increasing household and institutional demand. Community leaders made an effort in increasing the capacity of water supply system by adding alternate water source from Chandeswari. Later, when the water supply was again not enough, they approached Sasipani of Devitar village Panchayat for the second time to negotiate for getting additional water but this time local community denied providing water. One of the key informants stated:

People from Devitar did not allow Banepa to take water as they wanted to secure their own needs. The community feared that providing additional water to Banepa might affect their irrigation system on which their livelihoods depend.

Exploration of other possible ways to increase the capacity of water supply continued. As an alternative source, local authorities attempted to extract groundwater but found it was not feasible as per the study of Japan International Cooperation Agency (JICA). Later, in 1993, in the quest of searching new source of water for potentially new water project with the support of JICA, the spring

located at Kalanti Bhumidanda was found potential. The then mayor of Banepa approached the chair of Kalanti Bhumidanda VDC for the support. However, Banepa was unable to secure the identified water source because of the refusal of VDC to provide water to Banepa owing to their own dependency on the water source and an existing water sharing agreement with Dhulikhel municipality.

The water management story of Panauti, a cultural town dominated with rural characteristics, differs from Banepa and Dhulikhel. Compared to these two municipalities, Panauti is richer in water resources as the Roshi and Punyamata rivers flow through its premises. However, Panauti also faced problem to secure water to town dwellers and as we learned, it has been primarily due to the lack of planning and financial resources.

The water supply system of Panauti, managed by NWSC, supplies water to households located in the *old Bazaar* area covering about 27% of the total population. The construction of this supply system was made possible by the financial contribution of Dhulikhel drinking water users committee as a compensation provided for using Panauti as route of water intake. The quantity and quality of water supplied by this system remained very poor (MoUD, 2013). In the wet season, water run only for a few hours and the situation becomes acute in the dry season when supply reduces to an hour every alternate day. As an effort to fulfill the unmet need of water, the town focused on small-scale water schemes. Other 58 small-scale water supply schemes and 40 spring sources remain scattered throughout the municipal area according to the availability and the need. For realizing such schemes, fund was leveraged from various sources. Small scale schemes of Subbagaun, Dhaneshwar, Bansaghari, Taukhal, Malpi, BhandariGaun and Pashtali were supported by Red Cross Society-Panauti, Dhulikhel Development Project and Rural Water Supply and Sanitation Fund Development Board.

Despite of the presence of multitude of supply systems, the lack of adequate supply of quality water drove the inhabitants to keep their eye open to an alternative water supply system. While exploring the reasons behind unsustainability of water supply in the town, one of key informants said:

Limited investment in small scale and scattered water projects is the main reason that the communities are deprived of sustainable water supply. Water projects are initiated without having long term planning and without having adequate water sources meeting the growing demands.

The above water management cases of the three adjacent towns revealed that sustainable access to and use of water has always been a challenge. To keep up with the pace of increasing demand of water, all the three municipalities strived for an alternative source of water within and outside the administrative boundary to increase the water supply. Negotiating with upstream communities was the key challenge faced by Dhulikhel and Banepa whereas Panauti faced the problem of access to financial resources to build bigger sized water scheme. The experiences of the negotiation process gathered from the case study cities showed that a strong leadership with negotiation capacity is vital for reaching to an agreement.

The three municipalities of Kavre valley explored an opportunity of a large-scale drinking water project. Below, we elaborate the process through which the consensus among three municipalities were forged and the effort was made to negotiate with donors. The Kavre Valley Integrated Water Supply Project funded by Asian Development Bank (ADB) under the Secondary Towns Integrated Urban Environmental Improvement Project (STUEIP) is in the final stage of completion. While municipalities perceive this project as major breakthrough towards urban water security, as we highlight below, there also involves challenges ahead.

3. THE KAVRE VALLEY PROJECT

3.1. Initiation of the project

The hardships faced by three towns of the Kavre Valley in managing the growing water demands led them to explore a new water supply system in the early 2000s. Each town was in search of technical as well as financial support to enhance water supply as it was beyond the capacity of the town alone. In the meantime, in 2002, the GoN, in collaboration with ADB, initiated a project named Secondary Towns Integrated Urban Environmental Improvement Project

(STIUEIP) for supporting urban infrastructure development and strengthening municipal capacities of cities nearby Kathmandu Valley. All three municipalities of the Kavre valley approached the project to build a new water supply system and each proposed Roshi khola as the potential water source.

The Ministry of Urban Development prioritized those proposals and conducted a feasibility study with few criteria – adequacy of water, technical complexities, environmental and financial implication and operation and maintenance costs. In addition, the study report submitted in August 2007 also concluded that the Roshi Khola water source was feasible for the envisioned projects. Further, the report suggested a joint investment model which would be comparatively cost effective and environmentally friendly as municipalities are intending to extract water from the same source. The study reported NRs. 60 million differences between individual three projects and a joint project (the proposed total cost of three project summed NRs. 230 million). The ADB became ready to contribute 35% of the total investment as loan if joint investment is agreed. To deal with the ongoing negotiation process, a Kavre Valley Drinking Water Direction Committee was established in 2002² under the leadership of Dhulikhel.

The opportunity of realizing the dream project of all the municipalities was at the doorstep. However, Panauti municipality was not happy with the offer primarily because of two reasons. Firstly, the local community of Panauti feared losing their irrigation water. Secondly, the proposed modality of loan was not acceptable to Panauti. After series of discussions, Panauti accepted a joint investment model. The chairperson of the Kavre valley water supply management board stated:

Series of meetings among community leaders, like-minded people of the community and the senior officials from the Ministry of Urban Development were organized. These meetings played a crucial role to bring Panauti municipality and its people to an agreement for a joint investment model.

2 Kavre Valley Water Supply Management Board was established in 2015 as per the Water Supply Management Board Act (2006). Since the establishment of this board, Dhulikhel has been leading the board and chairperson of this board is the present mayor of Dhulikhel.

After building consensus among three municipalities for a joint investment, Kavre Valley Drinking Water Direction Committee made a joint agreement with upstream community for securing water sources. The committee submitted the joint proposal supplemented with the joint agreement and the project- KVIWSP was approved. The procurement process started and was awarded to Chinese company Ningbo Ningshing International Inc. in December 2012. Subsequently, the project started in June 2013 with an estimated investment worth NRs.87 million. The financial support from the ADB (35 % loan), the Town Development Fund (TDF) of GoN (50 % as grant) and the remaining 15% from the residents of three municipalities was designed in 2010. The project was designed to divert 77.33 liter per second (liter/sec) of fresh water from tributaries of Roshi khola of then Bhumidanda and Kushadevi VDCs (current wards of Panauti municipality). The project targeted to supply 24 hours drinking water of national standard with an estimated 65-80 liters of water per day per person to an estimated population of 1,39,422 of three towns.

As the project is implemented, the independent Board of Directors (BoD) will oversee the management of the new water supply system. It will be the paradigm shift in the governance system of water management where the board under the leadership of the Mayor will operate the system. The board retain the power to formulate and implement policies and manage all the water related services.

KVIWSP is an integrated large-scale drinking water project where all three municipalities made a collective effort to get water from a single pipeline system with the logic that it will not only minimize the implementation cost, but also build social relationship, widen equal participation in management and operation, thereby reducing potential disputes on water sources. The joint effort demonstrates of how common understanding can be built amid differences in views, perceptions, interests and knowledge among the owners of multiple water sources. Similarly, the process of building solidarity between the municipal authorities and upstream communities has demonstrated an exemplary socio-political consensus and people-to-people connection in achieving water needs. Below, we elaborate the process of negotiation that helped materialize the project.

3.2. Negotiating water sources

Available documents such as meeting minutes, office records and consultations made with key informants showed that the project passed through obstacles and hectic negotiations with the different concerned groups of the water source communities in different time periods. For instance, *Roshi Khola Sthaniya Sarokar Samiti* (Roshi River Local Concern Committee), a concern group representing the community of Panauti put forward their concerns causing the obstacles during the designing phase of the project. The main concern of the group was that sharing water from the designated source to downstream municipal areas might adversely affect their own water use practices especially for irrigation in the dry seasons. The municipality authority and political leaders of three municipalities started a series of discussions with *Sarokar Samiti* leading to a mutual agreement in 2008. The recipient group agreed to allocate 40% of the total water of the project for Panauti only. In addition, they also agreed to support the community of Panauti to build lift irrigation as compensation.

The main negotiation with the upstream authority and community was done to secure water sources (Muldol, Sisha khani, Baira Mahadev, Gudgude and Khar), traditionally used by upstream communities. For this, the consensus building among communities was initiated by organizing meetings in a row by the representatives of three municipalities. During the negotiation process, Dhulikhel Municipality played a leading role. After series of two-way dialogues, they were able to make an agreement with the then upstream VDCs: Bhumidanda and Kushadevi in 2010. As per the agreement, the downstream municipalities need to contribute cash of NRs 13.5 million (7.5 million to Bhumidanda and NRs 6 million to Kushadevi) over the period of five years of project construction phase to the upstream communities in the lieu of their efforts in water source management. In addition, the downstream communities need to provide other in-kind support such as subsidy in health treatment at Dhulikhel Hospital, quota for scholarship at Kathmandu University, upgrade health facilities at upstream communities among others.

Nevertheless, reaching an agreement in a complex socio-economic as well as political context was not an easy process. While encountering the complexity that arose during the course of reaching an agreement, the chairperson of Kavre Valley Water Supply Management Board recalled as:

Series of meetings with the officials and political party representatives at the community, VDCs (Bhumidanda and Kushadevi) and district levels were conducted. It took almost 7 months to build consensus with the upstream communities in order to have the agreement. After tedious discussions among and between community leaders and authority, the agreement was signed in the mid night at 2 a.m. of March 2010. You can imagine how intense was the discussion and how much efforts we might have put into this agreement process.

He further elaborated about the consensus building process as:

From the beginning of the project, the involvement and cooperation of leaders of all political parties and representatives of local level authorities were instrumental in building consensus. We all political parties were united and we had a unified voice, as the project was the developmental needs of the people. Though, we might be from different political parties, in such people's projects, we had solidarity. Overall, for building consensus, leaders from all political parties of all levels were equally involved, nevertheless Dhulikhel played a leading role.

Evidences from our case showed that building consensus is crucial to have access to water sources located beyond the political boundary. However, bringing entire upstream communities in confidence during the course of implementing the project remained one of the greatest challenges. When negotiation team forged consensus in one group, the other group come with another demand. For example, in 2013, the traditional users of Roshi khola³ particularly Bhumidanda VDC formed *Nagarik Sarokar Samaj*. Despite having an agreement in 2010 for providing water for the project, they denied and submitted 19- point demands halting the

3 People who have been using water for running traditional water mills and irrigation from generations.

project progress (GoN, 2014). They had fear that water abstraction from the source will adversely affect the water availability in their water mills and irrigation systems thereby affecting their livelihoods. While exploring how the consensus was built between the *Nagarik Sarokar Samaj* and the project, the coordinator of the Kavre Valley management board recalled as:

The project organized several meetings among the members of Nagarik Sarokar Samaj, project officials, political leaders and municipal authorities. One to one discussion was made on the demands though some of the demands were already addressed by the project and some were beyond the capacity of the project. Finally, they allowed us to smoothen the project activities after making a seven -point agreement to address their demands.

However, the upstream community remained unhappy with their own community leaders because they felt the process of negotiation was not inclusive disregarding the concerns and voices of its people. During focus group discussion at upstream community, the respondent stated:

The leaders of our community made agreements at mid-night without involving the wider community. They do not want to include community as such in the decision-making process of such an important issue. We are the one, who conserve natural resources including water but we are excluded in the decision-making process.

This implies that during such negotiations, top-level leadership of the communities get involved but it is not guaranteed that the wider voices of community is included.

At the present context, upstream water sources located at the then VDCs (Bhumidanda and Kushadevi) are now within the political boundary of Panauti municipality after the local level restructuring process in 2017. This has given an opportunity for Panauti Municipality to manage the possible future conflicts related to water source.

The above analyses showed planning, designing, building and operating large water infrastructure project is beyond the technical

and structural measures and depend upon the strong foundation of social cooperation among communities. In our case study, the joint efforts of three municipalities were very important in bringing the large-scale project into an operation. Series of political dialogues between and among the concerned stakeholders including community played an important tool of negotiation processes for resolving the concerns and conflicts emerged during various stages of the project. Therefore, to ensure adequate, inexpensive and sustainable supplies of water through large scale projects involving multiple interests of the multiple stakeholders need giving importance to social fabric and uphold the benefits of the source community.

3.3. Major challenges of the project

Despite of opportunities, the project suffered from several constraints. The series of delays due to dissatisfied traditional users of water source, the 2015 earthquake, and the economic blockade by India in 2015 created major hindrances for the project resulting in the overrun of the total project cost to NRs.112 million with a variance of 47.20%. Though, the project was expected to be completed by 2015, only 97% of its physical work was completed at the end 2019. More recently, COVID-19 pandemic has become another reason of the project delay which could again shoot up the project cost. As the project comes close to the completion, it is seen as solution to the mounting water demand. However, as we elaborate below, there remain challenges ahead in effectively governing the large-scale scheme.

Paying back the loan: KVIWSP differs from any of the earlier smaller schemes as it was built with loan support and there remain challenges to pay back the loan. Of the total budget, 35% is the loan from ADB and 15% is community contribution, other being grant from government of Nepal. According to the project agreement, the loan needs to be paid back within 20 years of time with 5% annual interest rate. For the municipal authorities with limited financial capacity amidst the growing developmental demands of the communities, paying back large chunk of loan within the given time period can be challenging. Further, as mentioned earlier, the cost

of project construction has been surged by 47% due to delays. This indicates an increase of proportionate loan amount as well. The increased loan amount has put additional burden to the municipalities.

Sustainability of water sources: The five water sources (Muldol, Sisha khani, Baira Mahadev, Gudgude and Khar) of the project are located about 16 km away from the Roshi khola with an uneven geographical terrain and muddy road. There are ongoing activities of extraction of stones, aggregates and minerals is on rise along the Roshi khola. More than two dozens of crusher industries along the riverside have been polluting the river by directly discharging the mine effluents including rocks which has even changed the flow of the river.⁴ These activities are not only degrading water quality but also posing threat to the water sources. If no effective watershed conservation measures are taken, the water sources of the Kavre Valley project will remain under threat.

Institutional challenges: After the completion of the project, the responsibility of the existing executive committee of Kavre Valley Water Supply Management Board will end. This executive committee was established for the construction phase of the water scheme and will be handed over to the new governing body (water management board). The new governing body will be responsible for responsibilities such as developing water distribution mechanism and defining water tariff. The body will also have key role to play to maintain the relation with water source community. However, structure of such committee is yet to be finalized as no concrete decision at the Federal Ministry has been made for the formation of a new executive committee of the board.

Disaster unpreparedness: Roshi river which is a major water source of three municipalities witnesses flood and landslide risk during every monsoon season causing huge loss and damage of properties. The risk of flood and landslide is more intense during the monsoon (June-August) causing huge damage of properties (MoHA, 2020). For instance, in May 2020, water pipeline of Dhulikhel was damaged by a pre-monsoon flood of Kharkhola. Similarly, another

4 <https://www.onlinekhabar.com/2018/05/680362>

flood event of the Punyamata⁵ during the monsoon of the same year also damaged the water pipeline of Dhulikhel. Because of damage to water pipelines caused by these flood events, the water supply system of Dhulikhel was cut off for few days. Such types of climatic disaster occurring every year could add financial burden to the project and bring sudden water crisis. Failing to introduce such disaster preparedness measures could result in huge loss of investment of KVIWSP in the future. In such cases, smaller schemes continued to work indicating more resilience during the time of crisis.

4. CONCLUSION AND WAY FORWARD

This chapter documented the experiences and joint effort of three municipalities of Kavre valley towards developing an inter-municipality large-scale water project as an attempt to meet growing urban water demand. We elaborated the negotiations of the municipalities with upstream communities to secure water sources for the new project.

We argued that the larger schemes inter-municipality projects are more feasible and achievable but there involves a lot of efforts to negotiate the water sources and in developing governing mechanism inclusive of all municipal authorities. The insights of this case are that the process of consensus building between municipal authorities and upstream communities is crucial and the political leadership with good negotiation skill is instrumental.

As the Kavre valley case shows, large-scale projects are the requirement of today's urbanizing trend and to provide solution to increasing water stress, however, there are a number of challenges to materialize and manage such projects ensuring equitable water provisioning. Other key challenges include the payback of loan to the donor, emerging conflicts, associated disasters affecting the infrastructure and inclusive governing mechanism. From this analysis, we conclude that while large scale projects are required for addressing increasing urban water demand in the lower Himalayan

5 Punyamata is one of the tributaries of Roshi khola. Punyamata river meets the Roshi khola in Panauti

towns, we should also not undermine the importance of smaller scale community-based schemes which play a vital role in ensuring equitable and sustainable water supply.

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