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Evolution of Drinking Water System in Dhulikhel: Trials and Tribulations

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SUMMARY

This chapter unfolds the fascinating story of struggles and triumphs of the evolution of Dhulikhel's attempts to secure urban water supply. The aim of the chapter is to familiarize the readers with the emergence and evolution of the community-based water resource governance system in Dhulikhel and reflect on the key insights that can be amplified to other municipalities adopting similar water governance system. The chapter elaborates on the relentless pursuits, obstacles and resolutions strategy adopted throughout the process of installing a reliable water supply system in Dhulikhel. This chapter is prepared based on personal observations and earlier experiences of water management and the current practice of the sitting Mayor of Dhulikhel who is the lead author in collaboration with SIAS researchers. Despite increasing challenges to water security amid growing population, expanding market and climate change, Dhulikhel is exploring innovative ways to manage water supply by integrating the concerns of the adjoining areas-peripheral or neighbourhood of Dhulikhel, Banepa and Panauti. Dhulikhel water management story reveals that with the provisioning of the right structure in place along with the inclusive decision making and transparent management practices, unprecedented achievements are possible.

1. INTRODUCTION

The emergence of the drinking water system in organized settlements has its roots in the adoption of agrarian way of life leading to the formation of villages and cities. With traces of wells in Egypt and stone rainwater channels in Mesopotamia from 3000 BC (Juuti et al., 2007), the vitality of water for maintaining the livelihood in the early civilizations can be easily inferred. Over the years, rapid urbanization and high population growth coupled with ineffective water governance have exacerbated the problem of water insecurity. Many cities are grappling with the burgeoning challenge of water shortage (Biswas and Tortajada, 2010) further worsened by climate change. Rapidly growing cities in the Himalayan region are also bearing the brunt of this situation. With the population living in urban areas projected to move up to 60% by 2030, an uphill task lies ahead of these cities to ensure water security (Bajracharya et.al., 2019).

Against this backdrop, this chapter unravels the fascinating story of struggles and triumphs of a resilient water supply system in Dhulikhel- a small Himalayan town in central Nepal. The objective of this chapter is to familiarize the local policymakers and municipalities officials with the emergence and evolution of the community-based water resource governance system in Dhulikhel and reflect on the key insights that can be amplified to other communities adopting similar water governance system. Tracing the history of water supply in Dhulikhel, this chapter describes relentless pursuits, daunting obstacles and perseverant strategies undertaken for installing, improving and sustaining a reliable water supply system in this town.

This chapter is prepared based on personal observations and experiences of the engagement in water resource management for the last 25 years and current initiatives as sitting Mayor of Dhulikhel who is the lead author in collaboration with SIAS researchers. Besides, the chapter presents insights from a review of broad literature pertaining to the evolution of drinking water systems in organized settlements in addition to Dhulikhel.

The chapter comprises of six sections. Following this introduction, the second section narrates the history of the emergence of Dhulikhel as a vibrant town. The next section discusses the relentless pursuits of Dhulikhel to pioneer community based water management. In the fourth section, the beginning of a modern decentralized water management practice has been dealt. The fifth section provides an overview of the recent initiatives including policy decisions taken by the Municipality towards strengthening the water supply system. Finally, we conclude by highlighting key messages and learnings.

2. DHULIKHEL AS AN ORGANIZED SETTLEMENT

The evolution of Dhulikhel dates back to 12th century evidenced by the inscription of Uma Maheshwar. Born out of the policy of then Malla king Ananda Dev Malla to establish a well-managed settlement in the areas outside of Kathmandu, Bhaktapur and Lalitpur, Dhulikhel was strategically conceived as an entry point of the east. Ancient stories are rife with the description of the religious people like the Bajracharya, Joshi and Karmacharya sent from Bhaktapur to Dhulikhel to establish the latter as a renowned place. In a bid to address the water demand of the local people, Gangamaharani¹ during the early Rana regime established *Raj Kulo*², as an important source for managing water demands of the community. For the effective management of *Raj Kulo*, one people was also authorized who would get a certain portion of rice collected from local community in recognition of his contribution.

However, the problem of water shortage wasn't fully addressed. Hence, Srinath Byanju on behalf of the community leaders met then Rana Prime Minister (PM) Juddha Shamsher and requested for finding a sustainable solution to manage the growing problem of water shortage. During his visit to Britain, PM Juddha Shamsher brought 9 standpipes out of which 7 were installed in Dhulikhel *Bazaar* to manage water supply. Popular by the name of Juddha

1 Ganga Maharani was one of the wives of Janga Bahadur Rana who started the Rana Regime in Nepal and was the Prime Minister from 5 September 1846 – 1 August 1856

2 Ancient royal canal set up with an objective of ensuring smooth water supply and irrigation.

Dhara, this initiation marks a new stage in the development of modern water management in Dhulikhel.

The expansion of Dhulikhel trade up to Tibet and the east routes established Dhulikhel as a thriving market centre. Owing to this, pressure was exerted on the water supply system thereby calling for a need of an extended drinking water project. Additionally, population growth of the town posed a challenge to water supply. The problem was so severe that the residents didn't have water for flushing water-thrifty '*sulabh*' toilets which some of the residents were capable of building upon receiving training in India. Amid this scenario, the community leaders of Dhulikhel overheard the rumor of transferring the district headquarter from Dhulikhel to another town owing to severe water scarcity. In such a critical situation, a group of like-minded community leaders after intense discussions and deliberations found a remedy for the crisis. Out of their persistent effort, the Indian embassy in Nepal installed a water tank in Dhulikhel as early as 1982. Popularly known as the old water supply system, this project installed 27 public taps in the town (Tiwari, 2008). However, this could not adequately address the growing problem of water scarcity.

3. RELENTLESS COMMUNITY PURSUITS IN ESTABLISHING A WATER SUPPLY SYSTEM

The initiation of village Panchayat during 1980s and 90s towards the effective management and distribution of water supply is worth mentioning. During that period, the local administration requested the general public to use piped water only for drinking and manage washing and bathing activities by directly going to the river. To monitor the water usage, the Panchayat designated an individual who was popularly known as *Goofley* to function as a watchdog of the forest and water resources in Dhulikhel. Rules and regulations were formulated to ensure that people would go to fetch water for non-drinking purposes in rivers and the water for households would be used for drinking and cooking. *Goofley* was responsible for penalizing the offenders and making sure that the rules wouldn't be violated. He would keep a constant vigil on whether or not the locals violate the water rules and affect the water conservation.

With the passage of time, the dream of setting up a reliable drinking water supply system in Dhulikhel bore visible fruit under the leadership of some prominent community leaders namely Bel Prasad Shrestha, Hari Krishna Naseju, Shree Lal Makaju, Manik Lal, Bir Man Shrestha, Mishra Lal Shrestha, Ram Chandra Ghinanjy, Hari Krishna KC, Govinda KC, Ram Chandra Adhikari, Durga Prasad Shastri and Shailendra Kumar Upadhyaya among other. Dhulikhel also drew inspiration from neighboring cities like Bhaktapur where the German embassy had initiated 'Bhaktapur Development Project'³ to promote organized settlement and sanitation. As per the agreement between the Nepal Government and the German government, the German project of developing sustainable cities was in full swing.

However, this was not an easy ride. Only after relentless pursuits of the community leaders with the strong support of the public, the accomplishment was possible. Amid looming water scarcity scenario in Dhulikhel with expanding population growth and rise of market centres, one of the then community leaders invited a German colleague to visit Dhulikhel and offer some useful suggestions for resolving the widespread water scarcity. Furthermore, a dedicated team of community leaders of that time directly approached a government representative from German embassy for help which infuriated the Nepal Government in the beginning. GTZ put two conditions to the community: to bring a request letter from the government, and to convert Dhulikhel Village Development Committee (VDC) into municipality. After several rounds of negotiations, the Nepal Government authority eventually consented to write a letter to the German government incorporating the voice of the Dhulikhel community. After that, the Germans came to visit the water source area and prepared a project design. Out of a tripartite agreement among the Government of Nepal, the German government and Dhulikhel Drinking Water and Sanitation Users Committee (DDWSUC), the new drinking water project was successfully built in the 1987. Central to the project design was the idea that those who drink water should manage the system

3 This project began in 1974 with an aim of improving the living conditions of the people of Bhaktapur and restoring the historic city through improvement of infrastructure which included a sewage system, private access to water for individual households and street upgrading.

themselves. In this way, the project was modelled in the form of vesting the entire autonomy of operation and maintenance to the local community with technical support from the government and donor. The inherent nature of the project design called for strong community participation and mobilization of local resources for the sustainability of the water supply system. People of Dhulikhel have actively participated in various phases of the project ranging from planning, implementation to operation and maintenance. Some technical and financial support was also provided from Water Supply and Sanitation District Office and municipality during the implementation phase of the project. The government of Nepal handed over Dhulikhel Drinking Water Project to DDWSUC officially on the 7th July 1992. Such provision became instrumental in reaping rich dividends for the community and established Dhulikhel as a model town in community-based water resource management.

The evolution of Dhulikhel from a rural village to a municipal town is pretty intriguing. Once a district headquarter about to lose this status due to an acute water shortage, Dhulikhel rebounded into a vibrant city with the installation of an effective water supply system. To forge an agreement with the German Development Co-operation for water supply project, Dhulikhel required the status of a municipality. To meet this criterion, Dhulikhel had to acquire 0.4 million additional population which became possible only after integrating the surrounding Vajrayogini and Shrikhandapur village including some parts of Kavre. Demanding that Dhulikhel be declared as a municipality, Bal Krishna Byanju on behalf of the community leaders gave a formal letter to the town Panchayat. The then King Birendra declared Dhulikhel as new municipality in 1986 from the Far Western Development Region.

As per the tripartite agreement for the new project, the search for a water source area begun rapidly. A survey was done in the then Sasipani now Devitar and Kalanti Bhumidanda VDC regarding the feasibility of water source. Eventually, Kalanti Bhumidanda VDC was identified as a potent source area. Water from Saptakanya fall, from Kharkhola stream situated 13.5 km far located in Kharkhola Mahabharat Community Forest, in Kalanti Bhumidanda village was

brought to the town through gravity pipeline. The Kharkhola source is one of the tributaries of the Roshi river, which is a tributary of the Sunkoshi river. The then Dhulikhel leadership signed and entered into the first formal agreement with Kalanti Bhumidanda in 1985 to supply water to its inhabitants including the management of water sources at the upstream. As per the agreement, Dhulikhel agreed to construct a school, a bridge and provide health and educational facilities for the upstream inhabitants. The latest revision of the agreement in the early 2011 has increased the share of water supply for Dhulikhel further demanding its notable contributions to social and infrastructure development including conservation of the water source in upstream (Joshi et al., 2019). As of today, Dhulikhel has invested 10 million rupees for the socio-economic development of Bhumidanda as a strategic approach to sustain its water supply system. Beginning in 1989 as an integral part of Dhulikhel Development Project, Dhulikhel Water Supply Project was completed in 1994 (see Chapter 4 of this book by Neupane et al., 2021)

4. DAWN OF MODERN WATER MANAGEMENT PRACTICES

The emergence of Dhulikhel Drinking Water Supply Project (DDWSP) heralded a new trend in the Nepalese water management system. Unprecedented in the history of water governance in Nepal, DDWSP became the first drinking water supply project, implemented under the direct investment of the Government of Nepal with financial and technical assistance from the German Government, but operated as a community-based drinking water supply project. In the initial days, the water user committee (WUC) was set up as per decentralization act 1981 followed by Water Resource act 1992 which had provisions of community managed WUCs. Becoming a model of a self-governing institution, the DDWSP ushered a new era of decentralized water resource management in Nepal. The project was then handed over to Dhulikhel Drinking Water User Group- a pioneer community-based institution in decentralized water resource management. While the Government helped in its formation, the entire responsibility of

maintenance of water sources, strategies of water distribution, determination of water tariffs and conservation of source area was vested in the user group. The water user committee also collected 0.3 million as operation and maintenance funds from the local communities as per the agreement with German Technical Cooperation Agency (GTZ) to install the water supply project (Dhulikhel Case Study, nd).

As per this agreement, the pipes had to be purchased from Germany as the pipes available in Nepal and India were not sturdy enough for strong water pressure in the new system. However, the locals of Dhulikhel didn't want pipe to be laid through their lands. Moreover, the locals complained of high water tariff (Rs 35/month) compared to Rs 30/month in Kathmandu. But the Dhulikhel municipal authorities convinced the locals that they would get cleaner water for a longer period in return for paying fees to use water. By asking people to dedicate the price of half cup of tea per day for affording the cost, the municipality eventually succeeded in its objective. Interestingly, Dhulikhel also organized door to door campaigns to foster interaction with women who had major role for water management.

Inspired by the success of Dhulikhel water governance model, the Government of Nepal prioritized the community-based approach in its succeeding negotiations with donors and the local community related to water resource governance.

The introduction of a well-managed drinking water scheme created a multiplier effect in the social and economic life of Dhulikhel. Dhulikhel witnessed the establishment of a community hospital, several hotels including a university. Modern Dhulikhel boasts of a reputed national university, namely Kathmandu University in addition to 53 commercial hotels which are the lifeline of its tourism-based economy. The contribution of smooth water supply in the development of the town was visible. Over time, an increase in market demands and commercialization of the town along with expanding population posed a grave challenge for managing water supply in the town. Water supply to households drastically reduced from 24 hours a day to less than 2 hours a day owing to growing water demand (Devkota et al., 2018).

Since the GTZ project water supply targeted only the former Dhulikhel village, which was later designated as wards 2, 3, 4 and 5 of the municipality, a strong dissatisfaction was growing among the non-users of the project residing in other wards (Pokharel et al., 2019). In fact, the formal inauguration of the project was delayed due to reservations of people living in peripheral wards. As per the earlier agreement between then Dhulikhel water users committee and the disgruntled people, the residents outside the Bazaar area would be provided water by tapping local sources in the short run and alternative sources would be identified in the long run (Devkota et al., 2018). However, the agreement was not put in action by the concerned authority which aggravated the situation. In 2008, the non-users cut off water supply lines in Chaukot and Subba village and created water shortage in the wards 2, 3, 4 and 5 for two weeks. Contestations against the Dhulikhel water supply distribution system clearly manifested in the form of core-periphery divide (Pokharel et al., 2018) with the residents of wards in remote geographical regions denying equal access to the water supply system. While then core area- wards 2-5 received uninterrupted water supply, then wards 1, 6, 7, 8 and 9 had no access to water from the project. The original DDWSUC formed in 1992 did not include residents of the peripheral areas. Their exclusion in the committee intensified the grievances that population in the peripheral wards had due to unequal water distribution system. Furthermore, the conflict also emerged between users of old and new water systems – the former installed by Indian embassy and the latter by German embassy, people from Dhulikhel and surrounding municipalities, Panauti and Banepa. Amid this scenario, community leaders of Dhulikhel, Panauti and Banepa strongly felt the need for an integrated water management project to cater to the growing needs of the entire region. The growing circumstances demanded setting up a more encompassing water supply system to cater the water needs of the residents outside the bazaar area.

4.1. The ADB and Nepal government accord: contestations and resolution

Local leaders of Dhulikhel, Panauti and Banepa felt a greater need of setting up an extended water supply system with larger

pipes installed to siphon water from Roshi Khola and its tributaries. In 2010, Nepal government in collaboration with Asian Development Bank (ADB) started Secondary Towns Integrated Urban Environmental Improvement Project for supporting urban infrastructure development and strengthening municipal capacities of cities nearby Kathmandu. This agreement was inked between ADB and Town Development Fund incorporating municipalities of Dhulikhel, Panauti and Banepa. In late 2012, under the loan and grant assistance of ADB, Kavre Valley Integrated Water Supply Project (KVIWSP) was launched envisioning a provision of an independent board to oversee the new water supply system. The notion of an autonomous board marks a major shift in water governance. The board has the power to acquire, build, expand and rehabilitate service, formulate and implement policies. Water supply system will be operated by the Board under the leadership of the Mayor and water users do not have right to select their committee. With 35% loan from ADB and 50% grant, 15% of the total investment was collected from the local residents. As per the KVIWSP agreement, the upstream village will receive royalties from these water user municipalities for the development of schools and other infrastructures in the upstream water source village. ADB proposed a joint investment model with shared investments from Dhulikhel, Banepa and Panauti⁴. Moreover, ADB also agreed to invest in environment mitigation action plan, social resettlement, take corrective measures for resolving environmental issues and provide training for environmental management. While isolated investment would cost each of them 23 crores, the joint investment reduced it to 17 crores. However, Panauti initially rejected this offer primarily because of a serious threat emerging to its irrigation scheme from upstream area after providing water source for this project. In this scenario, relentless negotiations and meetings of like-minded community leaders ultimately resulted in an agreement for a joint investment model.

The project had to face many ups and downs before it finally came into operation. One of the major obstacles was the conflict between the people of Panauti and Chaukot area. Roshi Sarokar Samaj, a

4 One of the seven principalities under Bhaktapur of the then Saatgaon which included Dhulikhel, Banepa, Panauti, Nala, Saanga and Shrikhandapur.

community-based institution strongly rejected the idea of supplying water from Roshi watershed. They argued that supplying water from their village to other areas would adversely affect agriculture due to limited irrigation. Hence, the people of Panauti demanded free water supply as a compensation for providing a water source for this integrated water supply system.

Another aspect of the conflict was related to the acceptance of Ladkeshwar⁵ as a reliable water source area. Since people living in this upper settlement generated more waste and the existing water contaminated, the viability of Ladkeshwar as water source area became debatable due to the high water treatment cost and greater risk to supply water for settlements nearby the river.

Amid this scenario, Banepa, Dhulikhel and Panauti finally agreed to bring water from the then Bhumidanda VDC, now part of Panauti Municipality by offering 75 lakhs Nepalese Rupees as compensation for development activities. Additionally, an understanding has been reached to pay yearly royalty to one of the wards, ward 6 in Panauti (after the water is supplied from this source).

97% of the work of KVIWSP has been completed so far. In December 2019, ADB handed over the project solely to Nepal Government. Kavre Valley Integrated Drinking Water Board comprising of Mayors of Banepa, Dhulikhel and Panauti, a representative from Water Supply Corporation, NGOs among others has been formulated to oversee the water supply system and explore further options for improving the water supply service in three municipalities.

Nevertheless, challenges still persist in the management of water supply. The issue of conserving water sources have significantly emerged. Decreasing rainfall and increasing stone mining activities in the watershed have further aggravated the problem (Shrestha et. al., 2020). In this scenario, a policy decision for source area conservation focusing on water recharge, forest conservation and environmental development has recently been reached. However, this project will not be supplying water to new annexed

5 Ladkeshwar is an upstream water source area geographically remote from the local community.

wards that has become part of Dhulikhel Municipality after administrative restructuring in 2017. So new initiatives have been taken by the Dhulikhel's current leadership.

5. RECENT INITIATIVES

5.1. Extension of water supply to new wards

While DDWSUC manages water in most parts of Dhulikhel, other small water users committees also exist in the town. In a bid to address the problem of water scarcity in Dhulikhel, various measures have been put forward after the last municipal election held in 2017. The vision of current municipal government is to make Dhulikhel a water secured town by achieving a target of 'One house one tap' by 2022.

Since 2018, Dhulikhel has been mapping available water resources and water supply projects in a bid to systematize water supply system and supply adequate drinking water with an overarching objective. At present, Dhulikhel municipality is getting the supply of drinking water from Dhulikhel Water Supply and Sanitation System which will be connected to Kavre Valley Integrated Water Supply System after the completion of the Project.

The survey design and execution of project's new initiatives under the program of one house one tap started from Fiscal Year (FY) 2018/19 and the municipality completed few projects facilitating around 700 households (HHs) with one house one tap water service. These projects were constructed in coordination with the user committees and handed over to these committees for the operation and maintenance under the municipal guidelines. Dhulikhel municipality aims operating 5 drinking water projects and extending the supply to 2000 HHs by the end of the current FY 2019/20.

The municipality is working on providing safe and adequate drinking water, especially in its extended area of wards 1, 2, 8, 9, 10, 11 and 12. Out of the 17 ongoing drinking water projects in Dhulikhel, 5 are deep boring projects supplying water to Kavre (ward 9), Batase

(ward 10), Saankhu and ward 11. the aim is to enhance the water access to 400 HHs in Kavre, 372 HHS in Batase and 480 HHS in ward 11 by the end of this fiscal year. Meanwhile, reconstruction of ancient wells, ponds and taps is high on the agenda. The policy and program of Dhulikhel municipality for FY 2018/20 clearly states that the program of 'one ward one pond' will be continued to preserve groundwater recharge and enhance the flow of water. Likewise, collection and storage of rainwater and its effective use by adopting suitable technology has been provisioned. Establishing recharge ponds in dry hill areas with the support of Southasia Institute of Advanced Studies (SIAS) and private sector are other important provisions included in the annual municipal program. In collaboration with World Wildlife Fund (WWF) and Kathmandu University, the Municipality intends to conduct research on the conservation of Roshi Watershed area and the potentiality of Jhiku Khola watershed (Dhulikhel Annual Policy and Program, 2019). In realization of SDG Goal 6: ensuring universal, safe and affordable drinking water, the municipality has endorsed 'one house one tap' policy and allocated NRs 3 billion for implementing this policy. As of today, ward no. 1 and Dhital gaun in ward 11 have successfully observed the implementation of water supply. The target is to include additional 2000 households in this system in the coming FY. Majority of settlements in these areas are on hilltops or hillside and depend on spring, well and stream for water. Lifting water from rivulets to these distant uphill settlements is tedious and costly.

5.2. Policy initiations

In 2018, the municipality successfully organized a local water conference in collaboration with SIAS, Local Initiatives for Biodiversity, Research and Development (LI-BIRD), Institute for Social and Environmental Transition in Nepal (ISET-Nepal), Municipal Association of Nepal. Dhulikhel got an opportunity to demonstrate its initiatives towards water management to wider audiences. This conference brought key stakeholders into a single platform where research findings, experiences and ideas and innovations on water management and governance were shared and debated. The conference also provided a deliberative platform to

dialogue among State and non-state actors. In the conference, the technical sessions provided platform to share research findings and innovations and the policy dialogues provided concrete feedback for future policies and actions pertaining to address the water management problems at different levels.

In addition, to foster science policy interactions among water users committees, local representatives, representatives from adjacent municipalities, researchers, academia and media among other stakeholders, Dhulikhel municipality has been leading the forum titled *Pani Chautari* (see Chapter 8 of this book by Devkota et al., 2021). In the recently held sixth series of Dhulikhel *Pani Chautari* (27 February 2020), local leaders, representatives from water user committees, representatives from upstream and downstream communities, representatives from neighboring municipalities among others, reflected on the roles and relationships of the upstream and downstream communities in relation to water management and the need for developing an institutional mechanism for collaborative activities for mutual benefits and sustainable water management. As the sitting Mayor of Dhulikhel, the lead author of this chapter proposed the formation of a 'water council' that is institutionally as well as technically capable and socially inclusive ensuring the representation of concerned stakeholders including upstream and downstream communities to deepen collaboration on resource conservation and sustainable water use between the two communities including other stakeholders. Urging the residents to bring attitudinal and behavioral changes regarding the utilization and conservation of water sources, Dhulikhel has sought strong community support in managing the increasing problem of water management in the region.

More importantly, the municipality is mulling over the integration of all drinking water user groups into a single institution within a ward and handover the water management responsibility to a Water Board in each wards. This is a fresh thinking in the policy innovation which aims at smooth management of the water supply.

6. CONCLUSION AND KEY MESSAGES

The growing Himalayan towns grappling with the challenges of water security can adopt the decentralized water governance with local autonomy and leadership to see the positive changes in the water supply system. Nevertheless, a dedicated community leadership putting the common interest at the centre can accomplish clear goals with due co-operation from the general public. Against the conventional practice of top-down, bureaucratic and centralized resource management structure, the success of Dhulikhel's water management stands out as a unique case. The resounding success of Dhulikhel Drinking Water Project is a testimony to the significance of a strong and dedicated local leadership backed by the community members. Forging strong partnerships among the users, municipality, central government agency and donor is also the lesson on offer. The capacity-building measures targeted towards local user committees became pivotal in garnering public trust and commitment for the grand success of the project. The general acceptance of the locals to pay the water tariffs and operate the project on their own despite some initial hiccups clearly indicates the significance of a vibrant and dynamic local leadership.

Dhulikhel water management story reveals that through provisioning of the right structure in place and transparent management practices, unprecedented achievements are possible. Evidenced by the Dhulikhel case, not only the local leaders but also the unflinching faith of the common people for making the community-based institutions has yielded a better result. Meanwhile, the power of relentless pursuit of negotiation to seal a deal in the best interest of the community has also become evident by the tireless effort made by the local community leaders from the early days to get a sustainable drinking water source in the town.

In this scenario, following are the key messages:

- **Decentralized water governance with local autonomy and leadership:** Dhulikhel implemented some innovative strategies with a community centered approach to resolve various forms of conflicts throughout the history of its drinking water management system. Intensifying discussion among community-based institutions and allowing different members

of the community to have a fair say in the pertinent matter of water management was a successful model. Likewise, the proactive leadership of local government in door to door interaction with women, representation of women in water user committee and the ambitious program of 'one house one tap' among others played a crucial role in developing ownership among the locals regarding the management of water.

- **Source area conservation and sustainable water use:** Growing rift between the upstream and downstream communities in Dhulikhel offers some useful lessons in terms of source area conservation and sustainable water use. Instead of short term financial compensation, sustained efforts and investment in watershed conservation of upstream communities will determine the fate of community based water resource governance. The important message is to develop harmonious relationship between water rich upstream villages and vibrant downstream urban centres. Managing wide-ranging concerns of upstream communities including socio-economic development and environmental sustainability will determine the fate of community based water governance model.

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