Water Security and Inclusive Water Governance in the Himalayas

- ✓ How does a social justice framing help understand local peoples' claims over natural resources?
- ✓ How do power relations shape water access and distribution between core and fringe areas in Nepali towns ?
- ✓ What dynamics of conflict over water resources are emerging in the urbanising mid-hill towns of Nepal?
- ✓ How are civil-society groups responding to large dam projects in the Eastern Himalaya region of India?
- ✓ What issues and opportunities the newly formed local governments in Nepal are facing in implementing inclusive water governance ?
- ✓ How can participatory community engagement transform gender relations in agriculture and water management?
- ✓ How do agrarian structures affect groundwater access for irrigation in Nepal's Tarai Madesh?
- ✓ How can local experts contribute to inclusive water governance?

Notes to Contributors

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LOCAL EXPERTS AS THE CHAMPIONS OF WATER SECURITY IN THE NEPALESE TOWN OF DHULIKHEL

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ABSTRACT

This commentary paper examines our local expert engagement methodology that we developed to understand water supply issues as well as to inform the direction of our action research conducted in Dhulikhel, a small town in Nepal. Through three years of field-based research at Dhulikhel, our inquiry uncovered a range of data 'gaps' and emergent as well as long-term conflicts around increasingly scarce water resources. To respond to this gap and contribute to inclusive water management, we developed and used a local expert engagement method, through which we were able to pool and mobilise a rich repertoire of hybrid knowledge from a range of local experts in Dhulikhel and others from nearby towns. The method of expert engagement was simultaneously linked to deliberations among local water stakeholders concerned with water supply management. Based on the lessons from this work, we argue that rich local expertise exists in water management and policy in Nepal, one that transcends the dichotomy between indigenous and scientific knowledge. We also show that as formal scientific knowledge becomes hybridised in different ways, this creates an important and actionable opportunity for advancing local science-policy processes to support water security agendas across the country.

Keywords: water security, water champions, expert engagement, Dhulikhel

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INTRODUCTION

Generating actionable knowledge for managing water and crafting policy has become crucial in the context of rapid socio-hydrological change, urbanisation and increasing uncertainty resulting from climate change. The Himalayas are commonly depicted as a region with scarce data for decision-making pertaining to environmental management, particularly at scaled-down levels, wherein 'data' typically refers to models and formal outputs of scientific research. Management and knowledge scales do not necessarily 'match' the topography of the issues they seek to address (Ahlborg and Nightingale, 2012), as is the case with water security issues and scarcity dynamics (Bakker, 2012; Rasul, 2014). Generally, water security literature has focused on either technology led solutions to water provision, or integrative, adaptive approaches, where the latter focuses on the lack of scientific knowledge, poor planning and governance systems as main factors responsible for escalating water insecurity (Cook and Bakker, 2012; Zeitoun et al., 2016).

With significant rural migration and urbanisation affecting the Himalayas, water access and allocation conflicts are on the rise, particularly between up- and down- stream needs, wherein complex inter- and intra- conflicts take shape (Jury and Vaux Jr, 2007; Xu et al., 2009). Our collaborative research has examined the effects of small-town urbanisation on water supply, ecosystem services and livelihoods across rural and urban gradients of the lower Himalayas over the past three years. Water scarcity is an everyday negotiated reality for households throughout the Himalayas, with access characterised and differentiable through socio-economic and cultural relations, gender, urban and rural geography, and historical planning and development processes that may determine individual households' distance from both water and formal decision-making (Bandyopadhyay and Gyawali, 1994; Merz et al., 2006; Sudhalkar, 2010).

These dynamics give rise to unique opportunities for experimenting with how the geographic and institutional particularities of knowledge production can be related to diverse stakeholders, where such links may ground claims to legitimacy and expertise in decision-making (Gautier and Kull Christian, 2015; Van der Sluijs et al., 2008). 'Science-policy interfaces' (SPIs) have been characterised as "dynamic learning environments" wherein interdisciplinary stakeholders and knowledge forms can come together to debate and open up policy forms and directions (Tinch et al., 2018). However, engagement and momentum behind interdisciplinary SPIs have predominantly been at the international level, which mirrors researchers' production of a 'global' knowledge for global management forums (Ingold, 2012). This has arguably undermined the potential of productive engagements between research and local

practice, which includes questioning the relevance of 'global' knowledge at lower scales, and the masking of the ways in which the categories of 'science' and 'policy' are not separable but in co-evolution (Van den Hove, 2007).

This short research note paper presents our use of an iterative, participatory methodology to harness local experts and their expertise to contribute to the understandings of water supply issues and conflicts, as well as to inform and influence the direction of ongoing action research. Through two years of field-based research at Dhulikhel, Nepal, our ongoing inquiry uncovered a range of data 'gaps' and emergent as well as long-term conflicts around increasingly scarce water resources. Our small research team found that, after a short time, the research team themselves started to be identified as stakeholders in the highly politicised processes of development and negotiations around water management, and could not remain as objective, data-driven 'outsiders'. By negotiating and adapting a research path that was essentially that of neutral 'knowledge brokers', we gained increased insights and audiences for alternative pathways to water sustainability. We demonstrate how a rich hybrid knowledge pool engaged through research initiatives and local stakeholders can be brought into conversation with formal decision-making practices, and through these insights we advance the debate on the dichotomy between local and scientific, and explore

contexts where formal scientific knowledge becomes hybridised for the making of local science-policy decision-making processes (see Pohl et al., 2010). Below, we explore both the dynamics of water management at Dhulikhel, and the ways in which community and research needs intersect and co-evolve over time.

DHULIKHEL'S WATER SUPPLY MANAGEMENT CHALLENGE

Like many small towns in the Himalayas, Dhulikhel is situated at the top of a mid-range mountain. The town has a history that extends over two hundred years, initially as a gateway point between Tibet and Nepal's capital city of Kathmandu, and recently as a major touristic and educational hub. It comprises a small core with indigenous Newari people, and a periphery of more rural and poorer settlements of other ethnic groups in the lower elevation and drier hill slopes. Dhulikhel is one of the three interconnected towns situated within the Kavre Valley, the other two being Banepa to its west and Panauti to its south. The town has always struggled for water access, as it did not have the fortune of a high mountain watershed to supply water, which is the case with some Himalayan towns. However, the town was able to locate, to the south-west of the city, two higher elevation mountain watersheds. Since the early 1980s, Dhulikhel has tapped water from the Roshi Khola, a small stream in Bhumidanda

Village Development Committee, located 14 kilometers southwest of the town. This ambitious project was made possible through a combination of strong local leadership, German technical assistance and the sympathetic political support the town received from Kathmandu. Being close to the capital city and with strong personal links to the royal family, Dhulikhel leaders were able to secure assistance for their drinking water project, the first of its kind in terms of being a community-led partnership for designing, building and operating the project.

Over the past few decades, the town population has grown steadily, yet with less than 20,000 people, it still remains a small town in the South Asian context. The town has emerged as a popular destination for tourism, education and health services which contributes few thousand people to its mobile population. It is also the district headquarters, with over 25 district level offices of the Nepal government. For several years, since the start of the Roshi drinking water project, Dhulikhel was able to supply the needs of its residents. However, with expanding urban demands and infrastructures, it has become increasingly water insecure. In particular, the town expanded rapidly with the establishment of Kathmandu University, hospitals, hotels and other industries. The city is also expanding to incorporate new rural areas, which are drier, more remote, and poorer, all needing more water. As a former Mayor narrates, Dhulikhel has three important functions now: blood, brain and heart: "We have the

water supply system which is the blood; we have the University which is the brain; and we have a hospital, which is the heart". Yet the city water leaders are increasingly wary of growing water insecurity and a variety of initiatives are being undertaken to cope with these challenges.

STRUGGLES FOR WATER SECURITY

Water is governed through a complex ensemble of institutions representing five different stakeholder categories. First, water user groups include registered and unregistered groups of households working collectively to manage water supply, often located in the peripheral parts of the town. Second, the municipality is a key institution in terms of its supporting infrastructure. Third, district branches of the Nepali government exercise greater power in relation to district-level developments including water management, and there are at least four different water-related government offices in Dhulikhel: the District Soil Conservation Office, Division Drinking Water Supply Office, District Irrigation Office, and the District Water Resource Committee chaired by the District Administration Office. Nepal's water regulations also provide for the formation of a district water resource committee to represent the four government offices. These serve to regulate community-based water management. The Dhulikhel Drinking Water Users Committee (DDWUC), which

was established after the main water supply project was completed, is regarded as a well-functioning institution in Nepal by water stakeholders. The committee currently employs eighteen staffs, including an engineer who moved from the government role to the local community when the project was transferred to community management in 1994. As a result of the tumultuous political transitions arising from the Maoist war in the decade after the mid-1990s, a political vacuum started from this time due to a lack of formal leadership and a lack of local elections. In this context, the DDWUC emerged as an important political platform for local leaders. Through its long history of water management, Dhulikhel has been able to develop several leaders who proudly identify themselves as water champions and recall their struggles[5].

Dhulikhel's water security struggles can be broken down into five important dimensions. First, there exist inherent conflicts between the rural upstream and the downstream urban region, which includes Dhulikhel municipality as well as other neighboring towns. In the 1980s, the upstream communities agreed to provide water to the municipality in exchange for some development benefits, worth USD 2500 to construct a school building in the upstream community. The amount was paid by the Dhulikhel municipality and the water project. Initially, there was some reluctance from the upstream communities, but a few rounds of negotiations developed a compromise arrangement that included some benefits to upstream communities. However with political change, new leaders emerged who chose to defy the previous agreements. During a time of transitional politics, new authorities kept emerging and changing. A poster in the source village reads 'beware of water sellers', clearly expressing dissent towards local leaders who agreed to sell/enable

water access to Dhulikhel. Aside from local political dynamics, there has also been a concurrent national level constitutional discourse that favors local and indigenous control over natural resources, empowering local communities to assert claims over water and other natural resources. Such an empowered position to the rural upstream has been perceived as a threat by downstream urban (and rapidly urbanising) communities.

The second key factor impacting water governance has been the involvement of the Asian Development Bank (ADB), which has funded a government project (the Kavre Valley Integrated Drinking Water Supply Project) to set up a new pipeline from the Roshi watershed. The Bank proposed that Dhulikhel join a consortium involving two other neighboring municipalities, which is supported by efficiency and economy of scale considerations as well as the imperative to address wider regional water problems. Interestingly, the ADB has chosen

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[5] Within the book by Bel P Shrestha.

water projects as a promising investment with the prospect of good returns and is now working with three municipalities[6]. There is still a significant lack of clarity around how this project work will unfold, and the project is investing in both technical and institutional aspects of development of the water system. These are likely to have impacts on existing management arrangements and tariff structures for the residents of Dhulikhel once the larger project is commissioned, but these details are still under negotiation.

A third important aspect concerning water security in Dhulikhel is the distribution of water between different categories of users, in terms of their economic status, geographic location and needs or types of use (mainly domestic versus commercial uses). In particular, strategies for allocating water between big industrial users and small household users have featured prominently in the water governance debate. People living at lower elevations and within poorer belts away from the water supply station complain that they have not been treated fairly in water distribution (many marginalised households cannot access piped water). Newly settling residents also complain about

the high installation costs of connecting taps in their houses. There is a further contradiction between different uses of water. Dhulikhel water leaders have always argued that water is required for drinking, and the national water law also privileges drinking needs over other uses such as irrigation. However, distribution becomes complicated when trade- off decisions must be made between household consumption and commercial use allocations. More than two dozen hotels, a University with over 2000 students and nationally- reputed hospitals require significant amount of water for purposes beyond 'drinking', where these needs sorely test the capacities of the developed water supply system.

Fourth, the Roshi stream watershed supplying water to Dhulikhel and neighbouring municipalities is itself under threat, and the future of water security depends on how the watershed system is handled. A number of stone quarries have been established in the Roshi Khola watershed itself, driven by an opportunity to cater to the needs of Kathmandu and other neighbouring towns. There exist fears that the proliferation of these stone quarries will directly affect the water yield and quality.

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[6] The Government of Nepal (GoN) with financial assistance of Asian Development Bank (ADB) is implementing the Secondary Towns Integrated Urban Environmental Improvement Project (STIUEIP). One of the important components of the STIUEIP is the Kavre Valley Integrated Water Supply Project (KVIWSP) with an objective to improve the water supply system in Banepa, Panauti and Dhulikhel municipalities. As a joint water supply scheme, the project is designed to divert 77.33 liter/sec of fresh water from tributaries of Roshi River: Muldol River (35 liter/sec), Sisha khani River (25 liter/sec), Baira Mahadev River (7.5 liter/sec), Gudgude River (5 liter/second) and Khar River (5.23 liter/second). After implementation of this project, the supply of water in all three municipalities will be regular and sufficient to meet the needs of the current population.

This is complicated further by the changing climate in the Himalayas and the attendant impacts on the hydrological system. Part of our research analysed climate data over the past four decades, which showed that the average annual rainfall is declining (although there is no appreciation of this in the local water planning debates; Dahal et al., 2019).

Finally, which institutional modality can work best to establish and promote a sustainable and equitable supply of water is a key issue highlighted by this case. Dhulikhel's water governance is neither state-managed nor private sector provided. It is primarily a community-managed system closely supported by the central and local governments. It has the potential to supply water at a reasonable price, particularly compared to private sector management, and is also more efficient than the government agency. But as one of Dhulikhel local drinking water user committee (DWUC) officers remarked: "we have to recover all costs of the water supply system from the tariffs, where discussions reviewing its level are extremely contested in the annual user assembly". To what extent users understand the technical and economic requirements of the supply system and agree to pay for the continual cost of upgrades and maintenance remains a critical issue. How other institutions, such as different levels of government, whether Municipality and Nepal government agencies, can better work with local communities remains an important question in understanding and furthering water security.

RESEARCH STRATEGY TO HARNESS LOCAL EXPERTISE

Our research project emerged from a project call from the UK's Ecosystem Services for Poverty Alleviation (ESPA) programme whose main goal was to investigate the link between ecosystem services and poverty alleviation. A core research objective was to undertake our research with the active engagement of local stakeholders which contrasted with the other seven research goals that aimed to analyse, understand, examine or assess relationships between people and water on-the-ground but were not co-production-led. The partnership with researchers from Southasia Institute for Advanced Studies (SIAS) added more interactive space for research than was initially planned in response to the ESPA call. The Nepal national partner SIAS had clear intentions to engage with water stakeholders and to ensure that the water governance debate remained grounded and practical/practice-oriented during the research. In this context, Dhulikhel town was selected as a case study site as a result of our motivation to continually engage and demonstrate the results of research- based engagement on the ground, whatever these could be.

From the stage of initial site selection, we were aware that the question of water was a very sensitive one in the area (given the increasing dissatisfaction of the upstream community and the ADB project's plan to tap additional water for the downstream municipalities, and also perceived disparity

of access to water between the core and peripheral zones of Dhulikhel). In this context, our research started cautiously to avoid the research team being seen as taking a particular 'side' in ongoing debates and conflicts. Every actor was in a very reactive - and even defensive - mode when the water issue was introduced for discussion. An example of this was the vigorous criticism received from prominent water leaders when researchers attempted to bring the issue of unused spring sources into the town. This arose from an observation that several extant springs in the township had been discarded and were unused. When one of our researchers noted this, people in the town were unhappy (as it emerged that town leaders saw this observation as a conspiracy to thwart their plan to tap more water from the upstream Roshi river).

Immediately after the initial data collection during 2014 - primarily through key informant interviews and the review of archival documents - it became obvious that there was a clear sense of water insecurity in the downstream urban areas (involving Dhulikhel Municipality and beyond), and that the water supply system installed in the 1980s was not only aging but also becoming insufficient to meet these newly arising (and growing) demands. In this context, the ADB project promised to work with the government and municipalities to bring additional water to the thirsty urban settlements. However, we found that this effort was itself contested. We realised that stakeholders were taking positions based

on prejudices and only partial knowledge of the facts. This was in part an important source of inspiration to our team to gather data from every angle and present analyses of these to all concerned stakeholders. We organised three stakeholder meetings in which we presented emerging research findings. These meetings brought contesting stakeholders together, mediated by relatively independent research groups, and in a discussion setting that was primarily founded on data and evidence around water availability and access. These meetings were also crucial to communicating our approach to the stakeholders – that we aimed to undertake analyses without "taking sides" in the ongoing debate.

During these meetings, we were asked a number of practical questions, primarily related to hydrology, geology, and to biophysical aspects of the watershed. A major knowledge gap that we confronted was related to the link between climate change and water yield, the effects of upstream quarrying and land use change impacts on Roshi river flow, and the ways to conserve and recycle water. Many of these questions were outside the scope of the project, but as an interactive research project, we considered these seriously. For some questions related to climate change, we invested effort to gather data and analyse available data, but for others, we elected to turn to local experts. A variety of water institutions have existed for decades, if not centuries, in the case of community- based groups, with many experts still resident in

the water management landscape, who range from community water managers to formally trained professionals and administrators working within government agencies.

Too little national-level data exists and even fewer studies have been conducted on the topic of hydrogeology, climate change and water management in the areas surrounding Dhulikhel. At the same time, our interviews with key informants revealed that there were quite a few people who had accumulated knowledge on various aspects of water management. With the intention to address these information gaps, we organised a roundtable through which we were able to pool knowledge from various experts. What we found from within this community was a blend of disciplinary academic training and rich practical experience with institutional memory. The workshop involved three components: a briefing by the research team, a field visit, and then a roundtable discussion. All together 15 experts from diverse fields participated in the workshop over the course of two days.

A multi-disciplinary team of geologists, watershed experts, soil and hydro-meteorological experts participated in the workshop, as well as researchers from SIAS. The SIAS research team shared an overview of the study area and some findings and issues of the study site. After the presentation, experts visited the upper Roshi watershed where they managed to observe the complex land use of the

upstream areas, made up of villages, stone quarry sites, agricultural land and water mills. In addition, experts managed to discuss and meet with the local water millers, stone quarry laborers, farmers and local people.

From the many questions, we focused on pooling knowledge around water yield potential in the Roshi watershed in view of all the different types of development interventions and land use change. The focus was on how changes in stone quarrying, agriculture, forestry, rural-to-urban migration, governance and impacts of natural disasters affected the watershed and the flow of the Roshi river. In the post-field trip roundtable, experts discussed what type of planning was essential for watershed management and how this forum could be further developed as catalyst for enhancing the water security in the region. One of the co-authors moderated the meeting.

RESEARCH OUTCOMES AND LESSONS

Our research in Dhulikhel developed a significant local engagement component through time. This was in part driven by the local research partnership and in part by our reflective approach to research, with the space granted for methodological adaptation. In a more fundamental sense, we were inspired by the action research epistemology in the language of Kurt Lewin: "You cannot understand the world

unless you try to change it" (Lewin, 1945). One of the co-authors had significant prior experience and research work on critical action research in Nepal, and the Principle Investigator of the research also had strong connections to the study region. In fact, over time the entire research team became intimately engaged in the practical discourses affecting Dhulikhel and its surrounds through repeated interactions. It was almost impossible for us to simply collect data and leave the community without reciprocating, at the very least, by sharing our insights back to them. It was indeed this desire to engage that underpinned our subsequent idea to plan and design a series of stakeholder workshops and also an expert workshop.

As we progressed through the research, we confronted a number of questions that were beyond the scope of the project, where in addition, there was no pre-existing science or research that we could draw from (e.g. impact assessments about how geology is likely to be disturbed by stone quarrying and subsequent impacts on water). Confronted by these dilemmas, we decided to turn to a range of local experts who had very different epistemologies yet possessed considerable practical and applied experience. Our work with a range of 'hybrid' experts was revealing, especially when invited to observe the research context and when we forged a dialogue between our own research team and the local expert community. These insights arose largely as outlined earlier, we experimented with

a specific methodological framework for this two-way dialogue so that we could actively incorporate the issues-based and contextual observations identified by our invitees into the research design. We began to conceptualise this approach as engaged research that was informed by local experts' observations of the field, yielded and prompted through roundtable and informal discussions and wide stakeholder engagement.

It is hard to attribute any distinct, easily identifiable 'outcome' to our research work in the area. However, our interaction with a number of stakeholders confirms that the interactive research process, including the expert roundtable, has led to a number of changes in the water governance debate itself. Our ongoing presence and mediation has led to the amelioration of some elements of conflict, such as between up- and downstream areas, the recognition by local leaders of the merits of research and how research findings and evidence may inform their decision-making, which is matched in turn by a continued willingness on behalf of the municipality to explore alternative sustainable water options.

With time, our approach became increasingly interactive. Yet, in terms of methodology, our research framing did not provide enough space to engage with local stakeholders. This was the limitation of the project, mainly imposed from the funding agreement and our own motivation to engage with the scientific peer community. For example, while undertaking field work,

the need to remain neutral at times limited our ability to critically interrogate more contested domains of water governance. The research also demanded strong skills in both research and social engagement and mediation, and it is difficult to find such skills in one or even a few persons in the Nepalese context. Despite an explicit engagement strategy at the beginning and some diversity in research approach among the team members, the actual research process was reasonably adaptive, and there was good level of freedom to field researchers to adapt research process in a responsive way. The constant feedback from the field team and reflections helped to enhance the appreciation, among the entire team, of the importance of engagement and stakeholder consultations towards the middle of the project.

An important outcome of our engaged research in Dhulikhel is that stakeholders have now become more open to alternative ideas and options for securing water. From water leaders to government planners and international support agencies – all initially seemed to presume that Bhumidanda spring water was the only source of water security for Dhulikhel. Alternatives to this upstream source had not been explored. However, there are options such as rainwater harvesting, and local residents also see hope in the numerous small spring sources at different locations in the township. Commercial water users may also look at ways of recycling water. Kathmandu University has already demonstrated the

feasibility of this, but the issue of up- and out- scaling needs to be further explored.

One thing that is clear is that despite a complex institutional landscape, there is still limited effort in generating and harnessing the knowledge needed to ensure water security by any of these institutions. Under an already variable climate with the growing threat of climate change, Dhulikhel and its neighbouring towns (which draw water from Roshi river) need more robust planning, management and national policy support to achieve water security and to catalyse new development initiatives that can help harvest water from other sources. But moving away from one dominant approach requires broad-based water security planning nurtured by interdisciplinary science, enabling state policies, and politically accountable local leadership.

The forums we created and experts we brought are fraught with political issues, which could hardly be addressed in such a limited time frame. The view of the knowledge holder greatly varies according to their institutional position. For example, an expert serving in the government administration tended to emphasise the data and knowledge that would result in greater government control over resources. A disciplinary expert had strong tendencies to challenge another (forestry versus water). Experts who own businesses requiring huge amounts of water tended to overlook the social justice and access dimensions of water management. One way to handle

such positionality is to have a research team with good orientations and skills to reflect each approach (in the sense of Pierre Bourdieu), and any process to catalyse local expert learning processes should also entail a component to generate empowering data for people already disadvantaged or locked out of the decision-making process.

CONCLUSION

Linking science, research, common sense and political reasoning is required to achieve a fair institutional arrangement for water security, and engaged research and local expertise can provide much needed knowledge to help water stakeholders in the Himalayas to plan for water security that go beyond 'data scarcity' and 'down scaling' narratives. This commentary paper has reported our use of an iterative, interactive methodology to harness local expertise contributions to an understanding of water supply issues and conflicts, as well as to inform and influence local water planning and governance. Our research attempted to open up space for informed dialogue while also recognising our own roles and positionality as knowledge brokers within the local water management landscape. The process of project development, reviewing management options, and addressing new institutional needs is ongoing but our interventions and engagement have altered some of the pre-existing relationships and power dynamics between stakeholders in the region, and have facilitated conversations

that were not already taking place. While these might be seen as less purposive and ongoing science-policy-practice interface, as researchers, we did not have a preferred policy or institutional solution to the water security challenges of the region. Our strategy demonstrates the potential of knowledge-led interventions in the Himalayan context, where interactive and iterative research can create spaces for new, hybrid, pragmatic and at times critical and creative forms of knowledge and expertise around water management and policy. This means that the best form of knowledge to start serious conversation around water security could be neither scientific nor policy but be composed of a bricolage, a combination of rich institutionalised and hybrid forms of knowledge and practices of learning that are common in most urbanising regions in South Asia and the Himalayas.

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