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# Water International

## UNDERSTANDING THE NON-INSTITUTIONALISATION OF A SOCIO-TECHNICAL INNOVATION: THE CASE OF MULTIPLE-USE WATER SYSTEMS (MUS) IN NEPAL

--Manuscript Draft--

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<b>Abstract:</b>	<p>Multiple-use water systems (MUS) have been promoted by international organizations as a socio-technological innovation, and notably in Nepal where more than 300 MUS have been implemented for the last 15 years. However MUS implementation has been limited to donor-funded projects and MUS has not become acknowledged by government policies yet. We use a collective action framework to analyse the barriers and opportunities to institutionalize MUS in public policies and programmes in Nepal. Our findings show how perceptions of MUS are diverse and tied to different visions and organizational interests, resulting in a lack of common framing on MUS.</p>

# **Understanding the Non-Institutionalization of a Socio-Technical Innovation: The Case of Multiple-Use Water Systems (MUS) in Nepal**

## **1. Introduction**

International water discourses have called for a greater intra-sectoral coordination among different water needs and uses, while also defending bottom-up, participatory and cost-effective approaches to water planning and management for livelihood improvement and food security. The concept of multiple-use water systems or services (MUS) embed these three components – coordination; participatory; and cost-effective – altogether. However, despite its explicit resonance with the dominant international water governance approach, namely integrated water resource management (IWRM), it has not gained the success that one could have expected. Other water use technologies such as drip irrigation have achieved a far greater popularity and dissemination (see Venot, 2016).

MUS has been promoted since the early 2000s by around 20 reputed international organisations, members of the global ‘MUS Group’, ranging from the Food and Agriculture Organization (FAO), the International Fund for Agricultural Development (IFAD) to international non-governmental organizations (INGOs) such as Water Aid and iDE, donors like USAID, and research organisations such as the International Water Management Institute (IWMI) and the Stockholm Environment Institute (SEI). Despite this strong coalition, MUS is relatively absent from mainstream international water security discourses and, although diverse models of MUS pilots have been implemented in 22 countries, it has not been significantly up-scaled in any of these countries. A puzzling example of this lack of dissemination and up-scaling is that of Nepal. The concept of MUS has been championed since the early 2000s by several international organisations, and in particular by International

Development Enterprises (iDE). As of 2018, more than 300 MUS have been implemented by iDE<sup>1</sup> in 30 out of 75 districts, serving more than 55,000 people. At the same time, a considerable body of knowledge on MUS in Nepal has emerged, documenting their costs and benefits, outcomes in terms of income generation and their sustainability (Basnet and Van Koppen, 2012; Clement, Pokhrel, & Sherpa, 2015; de Boer, 2007; Mikhail and Yoder, 2008). Yet MUS has not found a place in national water policy debates, institutional frameworks and public programmes. For instance, MUS does not figure in the annual program approved by the National Planning Commission of Nepal, neither could it secure a place in the National Budget. MUS programs have been limited to donor-driven projects implemented by INGOs.

We are interested in exploring the reasons behind this limited institutional take-up, based on the specific experience of Nepal. Our first objective is to advance our understanding of how water innovations get institutionalized (or not) in the Global South. Our second objective is to propose policy-relevant recommendations for supporting the development of more diverse and locally relevant water systems in Nepal.

We consider MUS as a socio-technical innovation. Although many water systems are *de facto* ‘MUS’<sup>2</sup>, we consider here MUS as ‘MUS by design’, that is systems that are specifically designed to provide water services for multiple uses. We consider that the dissemination of MUS beyond donor-funded projects requires the collective action of a coalition of actors to bring institutional change and therefore draw on collective action theory for our analysis, bringing in concepts from discourse analysis (Hajer, 1995). Our study is based on more than fifty semi-structured interviews with key stakeholders, on informal observations and interactions with stakeholders during project meetings and workshops and on secondary data.

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<sup>1</sup> Helvetas and the Finnish Embassy have also implemented MUS under their programmes, but to a smaller scale and not exclusively as iDE did in their programmes, but along with conventional single-use water systems.

<sup>2</sup> For instance, a recent study (Verma 2011) showed that the water schemes implemented through the National Rural Employment Guaranteed Act (NREGA) in India are in majority serving multiples uses

We also draw insights from the recognition of farmer-managed irrigation systems (FMIS) in Nepal in the 1980s.

## **2. Understanding Institutional Change**

MUS is an hybrid concept and object, which makes the study of its dissemination challenging. Some organisations define it as a system or a service, while some view it as an infrastructure and others promote it as a framework and a model for water governance. iDE, the champion organisation of MUS in Nepal, conceptualizes MUS as a system with four components: a resource, an infrastructure, a community and a service (personal communication, iDE 2015). In our study, we considered MUS as a socio-technical innovation. Its dissemination in Nepal requires the collective efforts of a coalition of actors to trigger institutional change at the policy level. We understand institutional change '*as a difference in form, quality, or state over time in an institution*' (Hargrave and Van de Ven, 2006, p. 866), and by institutions, we mean '*...the prescriptions that humans use to organize all forms of repetitive and structured interaction*' (Ostrom, 2005, p. 3). We distinguish institutions from organizations (North, 1990).

Institutional change can follow different pathways and take different forms. We consider the collective action model (Hargrave and Van de Ven, 2006) as particularly pertinent to the case of MUS as it draws from both the technology innovation literature and the social movement literature. The technology innovation literature offers useful tools to analyse the creation of networks to promote MUS and the efforts of INGOs to push for the type of institutional change required to support MUS as a technology innovation. The social movement literature helps to understand how MUS has been framed as an innovation and what meanings are associated with dominant discourses on MUS. It also supports the analysis of the tactics that coalitions of actors use to challenge dominant power structures in the water sector.

Institutional change for MUS can occur at two levels: 1) at the community level where MUS are implemented and managed. MUS gets institutionalized through the collective effort of the water users and through the adherence to common norms and values; 2) at the national policy level where MUS is acknowledged and integrated in public water policies, programs and budget. We explored the former in an earlier study (Clement et al. 2015), which showed that MUS has been relatively sustainable with strong local institutions to keep the system functional. In this paper, we focus on the policy level, as we are interested in understanding the (lack of) recognition and uptake of MUS in public policies and programmes.

A collective action model posits that change happens through a series of political events that mobilize/frame structures for institutional reforms, brought by networks of distributed actors who interact and engage in collective action. The triggering factor for initiating collective action is the recognition of an institutional barrier to up-scaling and dissemination (Van de Ven and Hargrave, 2004). We draw on the framework developed by Hargrave and Van de Ven (2006) which distinguishes three main components shaping collective action: 1) framings/discourses, 2) networks/coalitions, and 3) institutions (Figure 1). We added the influence of the political economic context, as we will seek to explain how the characteristics of these three components have emerged, sustained and evolved, using a historical perspective. This added component will also be useful to draw policy-relevant recommendations, based on the understanding of what forms of collective action can take place in a particular context.

*[Figure 1 near here]*

*Figure 1. Theoretical framework, adapted from Hargrave and Van de Ven (2006)*

Discourses give meanings to institutional change, notably, by defining which institutions are seen as legitimate to address the problem considered, by allocating specific roles to different

actors and by providing a normative basis for policy action. The way environment and development issues are framed and defined can significantly influence the direction given to institutional change (Hajer, 1995). For instance, framing food insecurity as a result of low agricultural productivity or as a lack of entitlements to food (Sen, 1981) is likely to lead to a set of sharply distinct policies and institutional reforms. We consider in our analysis how international and national discourses on MUS differ or are similar and how they might have influenced each other. We also examine how particular discourses have hindered or supported collective action and institutional change.

Coalitions of actors play a central role in creating and mobilizing organizations and structures for institutional change. Actors may form coalitions around a specific storyline, which they find attractive and fits with their beliefs and interests (Hajer, 1995). However, even when actors within a coalition share a common discourse, the coalition has to address possible conflicts related to unequal power relationships, diverging interests, identities and tensions between grassroots participation and top-down authority (Hargrave and Van de Ven, 2006). We explore who are the actors that constitute the Nepal MUS coalition, what are the internal power dynamics of this coalition and how it is connected with the global MUS coalition.

Lastly, institutions shape the dissemination of socio-technical innovations, e.g. through defining technical standards and norms, legal requirements, processes for implementation or financing options etc. They also affect the ability of actors to constitute coalitions and to engage through these coalitions in collective actions. We pay a particular attention to how formal institutions such as national water laws and policies, local water governance got translated on the ground into operational institutional arrangements.

We see collective action as a political process that gives legitimacy to MUS as a socio-technical innovation and thus can lead to institutional change that supports its dissemination.

Hargrave and Van de Ven (2006) distinguish between two types of legitimacy: the cognitive legitimacy and the socio-political legitimacy. The former depends on how institutional change fits with existing norms and values whereas the latter relies on endorsements and support of important political actors. We will examine these two types of legitimacy to understand the barriers and potential opportunities for collective action.

### **3. MUS in Nepal**

Globally, the emergence of the concept of MUS largely came as a reaction of several water professionals from different sub-sectors in the early 2000s to the observed shortcomings of top-down planning and approaches that only consider one water use, either domestic, or irrigation. Invariably, it was observed that their single-use designed infrastructure was, in reality, used for non-planned uses as well. These water professionals defended the need for an alternative model for water service provision, that would be tailored to provide water to meet multiple community needs according to local contexts (Van Koppen, Moriarty, & Boelee, 2006). Although the concept of MUS has been implemented according to a variety of approaches, it usually involves participatory planning, finance and management of water services for multiple domestic and productive uses, taking people's multiple water needs as a starting point (Renwick et al., 2007).

In Nepal, traditional water systems have often provided water for multiple uses, ranging from irrigation, livestock, drinking water, water mills to cultural and religious uses. From the 1950s, different public departments were created, pursuing distinct mandates, namely the Department of Agriculture and the Department of Canal in 1952 (the latter became the Department of Irrigation in 1987), the Department of Fisheries in 1967, the Department of Water Supply and Sewerage in 1972. Because of the specialisation of public services for



water, water systems have become compartmentalized into single-uses, namely irrigation, domestic water supply, fisheries, etc.

Although many traditional water systems in Nepal were designed for multiple uses, the name ‘MUS’ as a socio-technical innovation and discourse was coined in an international project, in which IDE took part, and ‘imported’ in Nepal by them: *‘there has always been an effort, at least on the engineering part, to save water so as to maximize its use, by introducing a simple double-tap or another type of technology in rural areas. This effort was on, even before iDE-supported projects introduced MUS formally in some parts of Nepal’* (interview NGO officer, Kathmandu, Sept. 2015). In the early 2000s, iDE and WINROCK formally introduced the concept of MUS in Nepal, with several MUS implemented in the mid-Western hills under the USAID-funded smallholder irrigation market initiative (SIMI) project (2003-2009). According to a former iDE staff, MUS were introduced at that time in order to create a reliable water supply to use drip irrigation (interview iDE officer, Dec. 2017).

The first MUS introduced, and still most of the MUS today, are gravity-fed systems, that consist of one or two tanks and distribute water through one or two separate piped distribution systems (photo 1). This has limited iDE’s implementation of MUS to the hills. There are usually collective or individual taps for drinking water and collective taps used for irrigation. Building on the positive evaluation results conducted for the SIMI project (Eco-Tech Consult, 2004), iDE has made MUS one of its flagship interventions and has implemented MUS under several donor-funded projects, combining MUS with drip irrigation, horticulture trainings and vegetable collection centres to market locally produced vegetables. iDE has also developed partnerships to continue innovating on MUS for instance with the INGO Renewable World to use solar pumps to lift water.

MUS have also been implemented as a component of several long-term (>10 years) projects for water resource development, namely two projects funded by the Finnish Embassy and a project funded by Helvetas and SDC. MUS have hardly ventured beyond the realm of development projects. There is no government agency implementing MUS today. The Department of Irrigation (DOI) which is responsible for developing irrigation non-conventional irrigation section might implement MUS but this section did not draw any lesson from the experiences of IDE implementation of MUS. iDE Nepal has made some progress to ‘institutionalize’ MUS, and in particular MUS have been listed in the guidelines for local development block grants<sup>3</sup>. In addition, iDE and the Ministry of Population and Environment (MoPE) of the Government of Nepal developed a set of guidelines to design MUS in order to introduce and upscale MUS as a climate smart technology<sup>4</sup>. This study took place as a growing momentum to upscale MUS seemed to take place in Nepal, notably following the international MUS conference held in Kathmandu in February 2016, which led to the creation of a ‘Nepal MUS network’.

#### **4. Methodology**

We conducted semi-structured interviews between December 2015 and March 2017 with a range of stakeholders from government agencies, international and national non-government organizations (INGOs and NGOs respectively), experts and farmers using MUS (Table 1). Government agencies were selected based on the relevance of their mandate to MUS and INGOs and NGOs based on their engagement in promoting or piloting MUS in Nepal. Interviews with government agencies and iDE project staff at the district level were conducted in Dadeldhura district, Province number 7, and Kaski district, Province number 4.. The interviews with the representatives from local government bodies, which were at the time

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<sup>3</sup> These grants constituted the main funding channel from the central government to local government bodies before the federal structure was implemented in Nepal in 2017.

<sup>4</sup> These guidelines were not formally approved by the government yet at the time this manuscript was written.

of the study the village development committee (VDC), and with local water user groups were conducted in Kaski district.

*[Table 1 near here]*

Most interviews were audio-recorded and transcribed. The transcripts were then coded under Atlas Ti, a qualitative data analysis software. We followed an inductive approach, assigning initial codes based on the data. The first set of codes was grouped under themes and categories and the analysis was based on several back-and-forth and in-depth immersions with the material. Because of the lack of public discourses on MUS in Nepal, most of our discourses analysis examined how respondents framed MUS during our interviews.

As researchers, we held a specific position in this analysis as some of us are affiliated with an organisation actively championing for MUS at the international level. Our approach was to critically reflect on current framings on MUS and consider whether the recognition of MUS and its institutionalization in public policies and programmes are desirable and under which conditions.

## **5. Findings**

### ***5.1. Political-economic context***

Nepal is known for its abundant water resources and policy-makers have seen water resource development as a key component of economic growth, by tapping into the large hydropower potential of the country. National policy documents for water resource development in Nepal envision large-scale infrastructures for irrigation and energy production. Yet planned development has not materialised yet due a variety of political economic reasons (Suhardiman et al. 2015). Nepal's political economy is highly shaped by international development assistance. Nepal has been a heavily aid-dependent country for more than 50 years supporting

the provision of public services. For the fiscal year 2017-18, foreign aid is expected to represent around 22% of the total estimated budget expenditure of NPR 1279 billion (approx. USD 12.5 billion) (GoN, 2017a). The drinking water sector received USD 110 million in the next year (2016-17) (GoN, 2017b).

In Nepal, most government agencies and (I)NGOs follow a demand-based approach, whereby villagers are asked to provide their demand to the agency/project, usually following a public meeting organised by social mobilisers. However their demands have to fall within the project scope or mandate of the organisation and, in the case of development projects, often have to match with a given list of interventions. Few communities ask for MUS, unless the social mobiliser explicitly proposes it, because communities would like their requests to be funded – so they either ask for a water supply project or an irrigation system or a water mill – which in many cases will be used for other uses than those for which the system was initially designed.

Small-scale water resource development is led by several government agencies who are highly fragmented and have little interest to cooperate. There are indeed strong political interests against intra-sectoral coordination at the national level in the water sector (Suhardiman et al., 2015). At the local level, all district agencies were supposed to report to and coordinate under the former District Development Committee (DDC), but in practice, they were more accountable to their line ministries than to the DDC. The federalist structure might open new opportunities for collaboration, as all local technical staff will be placed in the same municipality under the leadership of elected political leaders. However, many observers suspect that old power structures and relationships will continue to shape water resource planning and development.

## ***5.2.Discourses***

Discourses on MUS fit well within broader international discourses on IWRM. MUS discourses promote a participatory and integrated water resource management, considering the different uses of water. IWRM discourses have gained significant traction in policy arenas in Nepal (Clement et al., 2017) yet MUS has made hardly any entry into public water discourses. Our analysis reveals important discursive barriers to its institutionalization. Firstly, many respondents framed MUS as a small intervention with limited impact, which probably cannot *per se* solve Nepal's water problems, e.g. '*MUS has been limited to collecting water in small tanks and transporting it to a few households in small areas*' (interview central government agency, Jan. 2016). Given the preference given to large-scale water resource development, this is a major hindrance to attract policy attention. Secondly, MUS holds a secondary and quite timid discursive importance among actors promoting MUS even among INGOs implementing MUS such as Helvetas or Water Aid, at the exception of iDE Nepal. iDE is the only real MUS champion in Nepal, whereby MUS features a central place in its discourses as exemplified by its website and presentations at several workshops. MUS, one could say, is the exclusive 'brand' of iDE Nepal. This is important to note because it affects, as we will discuss in the last section, collective action towards the institutionalization of MUS.

Second, discourses on MUS are highly fragmented. Definitions and understandings of MUS vary across different types of organizations, reflecting the different mandates and interests of government agencies. For instance, the Department of water supply and sewerage (DWSS) stressed the priority for MUS to provide drinking water supply whereas the DOI emphasized its irrigation component and the Ministry of Population and Environment viewed MUS 'as a climate change adaptation option' (interview, MoPE, Dec. 2015). This is perhaps not surprising as MUS is to deliver water for multiple uses, but this fragmentation does not

support the emergence of a strong common framing and discourse which would allow actors to form a coalition.

For some, and in particular for government agencies, the main advantage of MUS compared to single use systems is to be efficient and optimize water use. This framing contrasts to that found in international discourses which stresses the participatory approach and livelihood benefits of MUS: ‘A participatory, integrated and poverty-reduction focused approach in poor rural and peri-urban areas, which takes people’s multiple water needs as a starting point for providing integrated services.’ (Van Koppen, et al., 2006). On the other hand, INGO respondents particularly stressed the participatory approach as a key characteristic of MUS.

We also noted a discursive tension about what the ‘multiple’ of MUS means. Most INGOs propose a conceptualization of MUS, which is broader than that proposed by the MUS champion, iDE, notably by underlying the potential for micro-hydro. iDE Nepal on the contrary has always framed MUS as a water supply system that provides irrigation water for homestead vegetable gardening. As one iDE collaborator noted:

*I came to know at that time that one component of MUS is drinking water and the other is irrigation. We later talked with engineers and technicians of the drinking water [office]. We questioned how it could be called ‘multiple-use’ because it only included drinking water and irrigation. Rather it should be called ‘dual use’. If it is multiple-use, then it should include more uses... we used to crack a joke: MUS are not multiple uses but dual uses (iDE officer, Dec. 2015).*

Whereas differences of discourses and notably on the meaning of ‘MUS’ across types of organization were expected, there are also striking differences on what are the benefits of

MUS and in which contexts MUS might be the most relevant options. Notably, there are contradictory framings on the context to which MUS are best adapted, namely in water-scarce or in water-abundant situations. Some respondents underlined that MUS require a higher water flow than single use systems to supply water for both domestic and productive uses and therefore can only be implemented in areas with sources with abundant water flows: *‘We try our best to design MUS but it is difficult to get enough water. If water is not enough for drinking water, then a MUS is not possible’* (interview, development agency, Dec. 2016). On the other hand, other respondents stressed that MUS were suited to water-scarce situations as a way to optimize water use: *‘Single use of water is seen in areas where there is abundant water. MUS is a natural necessity particularly where there is scarcity of water. Water sources are getting drier due to deforestation etc.; here multiple uses of water naturally come in’* (interview, DDC, Dec. 2015). MUS has indeed been primarily framed as an efficient system that optimizes water use and saves water.

Our interviews at the community level were too limited to draw conclusions on local discourses on MUS, but these seem to be shaped by both the lived experiences and actual practices related to MUS and by the discourses of implementing INGOs. For instance, water users of a MUS implemented under an iDE project provided a relatively elaborate definition of MUS as *‘a process and technology that provides drinking water, irrigation, and that brings income through agriculture and kitchen gardening by maximizing the use of water originating from the same source’* (interview, water user, Kaski District, Dec. 2015).

### ***5.3. Institutions***

The water sector in Nepal is highly fragmented, with no less than eight ministries, line departments and other agencies in charge of water planning and management in rural areas. The largest Ministries that have a mandate explicitly related to water are the Ministry of

Energy (for hydropower), the Ministry of Irrigation and the Ministry of Water Supply and Sanitation (MoWSS). The Ministry of Agricultural Development the Ministry of Federal Affairs and Local Development (MoFALD), and the Ministry of Cooperatives and Poverty Alleviation and their line agencies also plan and implement small-scale irrigation schemes in rural areas. The Ministry of Forest and its Department of watershed and soil conservation and the Ministry of population and environment also conduct small-scale interventions for watershed conservation, such as spring protection, and for building climate resilience. Each Ministry and their line agency follow separate guidelines and policies for water resource development, such as the Irrigation Policy (2014) or the water, sanitation and hygiene (WASH) strategic development plan (SDP) (2016) or the Directives on water supply services (2012). The National Planning Commission is to provide overall steering for development and the Water and Energy Commission Secretariat (WECS) to guide water resource development in particular but both these organizations have little authority over the ministries. There are however two overarching policy documents for the water sector in Nepal, namely the Water Resource Act (1992), the Water Resource Strategy (2002) and the National Water Plan (2005). A new water resource policy is also currently under drafting.

There is no mention of multiple water uses in any of these policy documents or in the sectoral policies or in the poverty alleviation program. One exception is the mention of multipurpose projects and support to their development in the Irrigation Policy (2003, 2013) and in the National Water Plan (2005). Such projects, which like MUS are designed for multiple uses, refer to relatively large-scale hydropower projects that can also be used for irrigation. They therefore differ from the concept of MUS promoted by the Global MUS group that are community-managed systems developed through a participatory planning approach. The rationale for supporting multipurpose projects is that they ‘minimize the unit cost of services or products’ (HMGN, 2005, p. 68), a rationale which is also close to that of international



discourses on MUS. The Water Resource Strategy (2002) recognizes the need for holistic, integrated water management but at the same time, the document also reflects the siloes of the water sector, with the expected outputs and related activities to reach these outputs being differentiated according to distinct water uses (irrigation, domestic use, hydropower).

Beyond the lack of recognition of MUS, there are clear institutional barriers to MUS. For instance, the WASH SDP indicates that water supply schemes should not provide water for agriculture. WASH guidelines also strictly fix the capacity of water supply systems to 45L/capita/day, which would be insufficient for a MUS.

Actors hold diverse perceptions on the institutional barriers to upscale MUS. On the one hand, iDE Nepal country director, the most active proponent of MUS in Nepal, feels that major barriers lie in the entrenched institutional siloes that characterize the water sector in Nepal and in the lack of enabling environment, namely policies. iDE field staff perceive that the main issue is the lack of financial support provided by the government, and notably by the VDC and DDC, for MUS. They also underlined that the Department of Water Supply and Sanitation (DWSS), the main government agency operating in the WASH sector, follows strict guidelines on the design of water supply systems and are not open to develop and support systems that provided non-domestic uses.

In general, respondents who worked the most closely with communities remarked that most local water systems were used for multiple uses. The DWSS representative acknowledged that most of the water supply systems they had supported were also used for irrigation while defending that they would not be allowed to build systems that were designed to supply water beyond domestic uses. This shows a profound disconnection between national water policies that are highly sectoralized and local realities.

Other development organizations feel that the main issue is the lack of monitoring and evaluation of MUS by government agencies, a lack of awareness of the government on MUS or a lack of devolution of funds at the local level. Most government respondents stressed the lack of a common set of guidelines for MUS, which would provide the necessary technical standards for the design and implementation of MUS under their programmes: *‘So far, MUS has not been well grounded on policy. It is being done haphazardly, instead of following a policy. It needs to be moved ahead based on policy.’ ‘MUS needs a specific policy for irrigation and water resource policy first. Then they can cover all other related sectors within it.* (interviews, Kathmandu, Dec. 2015 and Feb. 2016). As a matter of fact, INGOs work with very different guidelines, with SAPPROS, a national NGO working under iDE-led projects, using guidelines on rural water supply schemes developed by UNICEF (drinking water) and guidelines from DOLIDAR, iDE and the MoPE having developed their own guidelines, etc.

#### ***5.4. Coalitions***

At the national level, the actors who recognize their organization as a promoter of MUS are almost exclusively INGOs and NGOs – with the exception of the MoPE. These (I)NGOS follow different approaches to implementing MUS with very limited exchange on their understanding of MUS, methods, and results. In addition, these (I)NGOs engage in their projects with different government organizations, ranging from the former VDC and DDC<sup>5</sup> at the local level, to the MoWSS, the Department of Local Infrastructure Development and Agriculture Roads (DOLIDAR), under the MoFALD, and the MoPE at the central level.

The choice of development organizations to establish partnerships with one government agency rather than another has been guided in some instances by the mandate and organizational structure of these government agencies. In the case of iDE, their model of

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<sup>5</sup> These were replaced by local governments called *gaunpalikas* and *nagarpalikas* in 2017 after the Nepal Constitution 2015 made Nepal move to a federalist structure

MUS is primarily a rural water supply system providing water for small-scale homestead irrigation, yet iDE Nepal has never engaged with the Ministry or Department of Water Supply and Sanitation (MoWSS/DoWSS) at national level. There are institutional barriers to cooperating with the MoWSS on MUS as discussed in the previous sub-section. Furthermore, iDE has a global mandate on rural entrepreneurship, which more naturally led iDE Nepal to turn towards agencies with a mandate related to agricultural development. iDE Nepal first seek a partnership with the Department of Agriculture, which almost led to the establishment of an MoU<sup>6</sup> whereby the Department of Agriculture would officially acknowledge MUS in its programmes and provide directives and incentives to its district-based offices to implement MUS. However, the MoU did not materialize and more recently, iDE's primary government partner has been the MoPE, with which they had good personal connections. This partnership however limits the potential for integrating MUS in government programmes on the ground, as the MoPE does not have any line agencies and local level offices. Furthermore, the MoPE has neither inscribed MUS as part of their program nor have they allocated budget for MUS implementation. iDE has at the same time promoted MUS as a climate-smart technology that helps building communities' resilience to climatic variability, which some observers attribute to a strategy to attract some of the massive amount of funding related to climate adaptation that is channelled to Nepal.

iDE initiated the creation of a formal MUS network, with a launching announcement at the International MUS workshop in Kathmandu in February 2016. The latter, organized by iDE, IWMI and the farmer managed irrigation system trust (FMIST) with the support of the MoPE and the MUS Global Group, gathered all main stakeholders engaged in MUS research and implementation in Nepal. It was the first time different MUS advocates formally gathered under the MUS banner. One year after the workshop, iDE organized a second smaller

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<sup>6</sup> The authors are not sure why the MoU did not move forward – it could be a change in individuals and notably of the director of the Department of Agriculture.

workshop, which was the first formal meeting of the MUS Nepal network, back to back to the annual FMIST conference. Professionals from the water sector, e.g. from FMIST, DOI and representatives from different donor-funded programmes, e.g. by the Finnish Embassy and INGOs, such as Helvetas gathered to present their own experiences and practices. The workshop ended with intentions to pursue exchanges and communication on MUS in Nepal through the creation of a website, facebook page and the organization of joint technical workshops for sharing experiences among (I)NGO technical staff. However the difficulty to sustain the network is visible – with minimal content on the website created and almost null activity on the facebook page.

At the local level, iDE project staffs have however managed to work with several government agencies across traditional siloes. These relationships seem to have developed primarily thanks to personal initiative, without a priori formal agreements, e.g. established at the central or local level, or under a common mandate and vision. For instance, several district project managers reported having collaborated with the District Soil Conservation Office (DISCO), while acknowledging that MUS only very partially fall under the scope of work and mandate of these agencies, who primarily work on soil and water conservation.

*If we look at the region, the district soil conservation office has supported us, for example. Normally this office is not a type of agency that provides inputs to MUS initiatives. It depends on individual office chiefs. They [officials] saw the outputs, observed them... they found that it was a good thing and decided to support. (interview, iDE district officer, Dec. 2017)*

One of the iDE project district manager recognized such partnership was possible thanks to his personal connection with the DISCO director. In this district, the DISCO had financially

supported the construction of 25 MUS in Doti under the project. On the other hand, IDE project managers acknowledged their inability to build connections with the DWSS, though MUS implemented under their projects are primarily new or upgraded existing water supply systems who also provide water for homestead vegetable gardening as a secondary use, so logically falling under the DWSS mandate.

*At the local level, we have issues with resource leverage. If we are to look at the XXX project, we haven't been able to gain leverage from the drinking water office. We even conducted a workshop, where we told them to either indicate that they want drinking water systems specifically so we can leverage funds for that, or to give us guidance because MUS isn't in their papers and we can't register them. So this is why we consider that policy is the biggest issue (interview, NGO officer, Kathmandu, Dec. 2017)*

As indicated in the quotes above, these cross-agencies relationships have been largely driven by the incentives to leverage extra funds under the project, and the difficulty to reach the project targets if failing to do so. The maximum budget ceiling for MUS fixed by the project was often insufficient in hilly areas, especially in cases where the source was located far away from the settlement and where the settlement was widespread.

*There was a case where the official said they would put aside 50 lakhs if we could provide the technical support. This kind of coordination can work because if they have the resources to invest, it can be done effectively. There is a definite need for this*

*and we do see there are open channels. (interview, iDE district officer, Dec. 2017)*

Therefore there is a limited institutionalization of MUS happening informally under local arrangements. Such collaboration is a win-win arrangement for both public agencies and iDE. It supports public agencies such as the DISCO to disburse public funds. The NGO has sufficient staff to conduct all the groundwork related to community mobilization, feasibility study etc, whereas government agencies are often limited in terms of human resource capacity. Such model contrasts with another form of collaboration, which was envisioned by the Government of Nepal earlier. During the SIMI project, iDE had commissioned a team of 8 persons representing different government ministries and department to conduct an assessment of the MUS in their project area. The team recommended that ‘funding for MUS as well as making MUS a regular program component should be constituted within DDC, VDC, Department of Agriculture, Department of Irrigation, DOLIDAR and Department of Drinking Water of Ministry of Physical Planning’ with iDE ‘providing technical direction and lead facilitation and coordination for MUS implementation’ to government programmes (Government of Nepal, 2012).

In some cases, it is the local user committee who facilitated intra-sectoral coordination, whereby DISCO funds were used to lift drinking water.

*We had this soil conservation programme. In our wards, we had this ward coordination committees and groups, we used to give each ward around NPR 75,000. [...] They used our money for MUS, to lift drinking water... The soil conservation office provided pipes... (interview, government official, Kaski District, Dec. 2017)*

However, such initiatives where farmers demand and leverage funds for MUS remain isolated cases. Farmers are not engaged in networks and federations that are promoting MUS. First,

there is as a whole no articulated demand of farmers for MUS as a socio-technical innovation, because MUS is a foreign concept imported by INGOs, with which most farmers are not familiar, despite using already most of their water systems for multiple uses. The few farmers who have heard of MUS are those who had a MUS installed in their community and who therefore do not need to demand for it anymore. Even if that demand was articulated, there are no local federations that have the capacity, interest and legitimacy to promote the institutionalization of MUS from the grassroots to the national level. The two water users federations, namely FEDWASUN and NFIUWAN, are divided by the same institutional siloes than government agencies, along domestic use and irrigation. They also have uneven coverage and activity level across Nepal. In addition, there are currently no federations of farmers' organizations that could move the MUS agenda forward. Whereas IWMI and iDE foresee the need to combine a bottom-up and top-down approach to institutionalize MUS, there seems to be limited formal institutional avenues for a bottom-up movement towards institutionalization, that goes beyond ad-hoc collaboration around MUS.

## **6. Discussion and Conclusion**

### ***6.1.A Historical Perspective on MUS and FMIS***

One can draw parallel experiences from the institutionalization of MUS and FMIS in Nepal. Some of the oldest FMIS were developed by communities several hundred years ago, relying on local knowledge, technology and management. The edict of King Ram Shah of Nepal legally reinforced the role of communities to undertake water resource development. Hence, FMIS developed – owned, managed and institutionalized at the community level – representing almost 70%<sup>7</sup> share in irrigated agriculture in Nepal in the late 1990s. Several research studies and national seminars took place during the 1980s, creating the momentum

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<sup>7</sup> This figure is based on records compiled by the Institutional Development Support Component, DoI, July 1997

for a strong network to develop. The thereby<sup>8</sup> International Irrigation Management Institute (IIMI) opened a field office in Nepal with the mandate to undertake research on FMIS in Nepal and Asia. IIMI notably worked with the Water and Energy Commission Secretariat (WECS), a government organization in charge of providing technical guidance and support for water resource planning to different ministries, and the Ford Foundation on an action research project on FMIS. The World Bank and Asian development Bank also showed interest in FMIS – at a time when narratives on the sustainability of community-based natural resource management increasingly attracted donors’ attention. A prominent international figure, E. Ostrom conducted research on FMIS as part of her broader body of work on common pool resource management.

There was also an institutional opportunity to recognize FMIS with the drafting of the Water Resources Act, to which WECS significantly contributed, adding specific provisions for FMIS and water user associations. The Government of Nepal has acknowledged FMIS as playing a central role to achieve overall food security, and has recognized FMIS in the various versions of the Irrigation Policy, which is regularly updated. FMIS also became part of the Basic Need Fulfilment Policy initiated by the National Planning Commission in the late 1980s. Nowadays, these systems still remain FMIS but have been supported by the Government of Nepal for their strengthening and rehabilitation, with public resources and foreign aid. FMIS have thus become institutionalized as community-owned systems with policy and budgetary support, resulting in a supportive legal framework for all government and donor agencies working with FMIS.

## ***6.2. Missed Opportunities for MUS***

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<sup>8</sup> The name later changed to International Water Management Institute as IIMI’s mandate broadened to water for food and water security



There were a few missed opportunities to institutionalize MUS. One was to embed MUS within the water user master plans (WUMPs) considered by some as the starting point and pre-requisite for MUS planning (Rautanen et al., 2014). WUMPs were developed and implemented by Helvetas. They explicitly promote multiple uses schemes and use a participatory approach to plan and prioritize water resource development locally, in joint collaboration with local governments. The two water programmes led by the Finnish Embassy have also relied on WUMPs for water resource planning and as of 2015, 175 WUMPs had been implemented in Nepal under these various programmes. WUMPs have been relatively well embedded within local governments and more importantly integrated in national policies by two ministries. First, WUMPs were recognized by the WASH SDP (2016-2030) as an effective planning tool supporting good local water governance. Interestingly, although the WASH SDP clearly limits its scope and mandate to the WASH sector, WUMPs have always explicitly recognized the need to plan for multiple water uses – hence they offered a unique entry point for MUS in the WASH sector. Second, the MoFALD and the MoWSS have recently issued a set of national guidelines for WUMPs, which could have been a formidable opportunity to upscale MUS. Yet this did not happen, notably due to the sectoral boundaries and poor linkages among INGOs promoting MUS and the lack of engagement of iDE with the WASH sector actors.

### ***6.3. Critically Reflecting on Upscaling MUS***

Several studies have documented the livelihood benefits of MUS in Nepal and elsewhere, yet MUS are not a panacea. There are multiple models of MUS and those are fit to certain conditions. It is clear that the iDE-promoted model of MUS is only adapted to localities with good access to markets and good market conditions, sufficient water flow to meet both domestic and productive needs, and potential for vegetable production, as observed by a government officer *‘Generally speaking, identification of [MUS] sites should be done*

*properly after carefully looking at communities, livelihood options, products and the markets, access to roads etc. The XXX programme was indeed a success. It was a good choice of place because it was near a market'* (interview, government official, Kaski district, Dec. 2015)

We recommend adopting a pragmatic approach closer to the ideals of MUS: taking people's needs as the starting point while adapting to the local biophysical context. This might require shifting from current demand-based approaches to a more integrated approach to planning, following for instance the planning guidelines proposed by WUMPs. Some INGO respondents pointed to the fact that in many cases, there was not enough water to design a MUS, and in this case they proposed a single use system providing water for domestic use: There has however been little reflection from development actors that MUS might increase water demand by providing water through piped systems. Of course, the primary goal of development interventions is to improve people's well-being notably by enhancing the delivery and quality of water services, yet there are sustainability and equity issues at stake which should be carefully considered.

#### ***6.4.Potential Avenues for Upscaling MUS***

The analysis underlined a lack of a clear and common framing on MUS as development organizations, including (I)NGOs (e.g. Helvetas) and donors (e.g. Finnish Embassy, USAID), have pursued different approaches for MUS and engaged with different government partners, each with their original sub-sector as entry point. A first step could be to develop a cross-sectoral typology of MUS covering all possible models with their specifications, e.g. gravity-fed or lift, type of uses, etc. This typology could help explaining what are the benefits of different types of MUS and under which conditions and for which context and sub-sector or programmatic entry point they are suitable. We believe it would support a more coherent framing of MUS in Nepal and a context-sensitive and need-based approach.

Second, the different actors engaged in MUS in Nepal need to identify and agree on what are the required institutional reforms to upscale MUS, based on institutional windows of opportunities. This could include integrating MUS in the forthcoming water resource policy or in the local adaptation plans of action (LAPAs). To pursue collective action however, the MUS network will need to overcome their current fragmentation and develop a common identity. Recent activities related to the initiation of a MUS Nepal network mark the recognition of a MUS as a rallying concept for action, especially among (I)NGOs and development agencies. It is unclear how this nascent network will mobilize resources and networks across multiple levels. Furthermore, as collective action is a political process, MUS needs to become an issue for political debate that is given legitimacy by powerful MUS champions within the government and among politicians.

Lastly, here are also potential opportunities to pursue a bottom-up up-scaling of MUS with federalism and increased power and autonomy granted to newly elected local governments, the municipalities and rural municipalities. The latter will have their own budgets and might be more accountable and responsive to local needs through the ward representative committees, more accessible to citizens than the previous VDC and DDC offices. However, there are also concerns related to corruption and collusion between contractors and elected politicians. Some observers also fear that development is driven more by the will to demonstrate visible signs of development (rural roads) than to improve local livelihoods with less visible types of interventions. The new government structure might also support increased cross-sectoral development as the officers from previous district level line agencies will all be physically and functionally under the municipalities. However the municipalities will also have to overcome current lack of technical and social capacity. INGOs and NGOs could have a role to play here, with technical guidance and training on inclusive approaches to water resource planning and development. Development programmes could therefore

gradually move from implementing interventions towards establishing knowledge and training centers and supporting governments in their new mandates.

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*Table 1. Number of informants disaggregated by type of organization and sex*

	<b>Government</b>	<b>INGO</b>	<b>NGO</b>	<b>Other</b>	<b>Male</b>	<b>Female</b>	<b>Total</b>
<b>Central</b>	5	3	4	3	13	2	<b>15</b>
<b>Region/District</b>	11	22	-	-	25	8	<b>33</b>
<b>VDC</b>	1	-	-	-	1		<b>1</b>
<b>Community</b>	/	/	/	8	5	3	<b>8</b>
<b>Total</b>	<b>17</b>	<b>25</b>	<b>4</b>	<b>11</b>	<b>44</b>	<b>13</b>	<b>57</b>

Figure 1

