International Workshop on

Multiple Use Water Systems (MUS) for Climate Resilience:

A Socio-Technical Approach for Improved Community Water Governance

PROGRAM ABSTRACTS

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Multiple Use Water Systems (MUS) for Climate Resilience: A Socio-Technical Approach for Improved Community Water Governance

Author: Barbara van Koppen*, International Water Management Institute, and coordinator, Global MUS Group

Abstract

This paper synthesises lessons learned across the globe during the past decade of innovation of the MUS approach. It traces how the **starting point** of planning and designing MUS evolved from a somewhat abstract "multiple water needs of rural and peri-urban communities" to communities' holistic water wisdom, including self-supply, and their priorities for incremental next steps.

The paper further describes the initial phase of **proof of concept,** generating the evidence and making the business case for MUS as a widely replicable improved practice. The challenge of overcoming the silos of the public sector was taken up from various entry points, in particular the WASH sub-sector, the irrigation sub-sector, MUS by design projects, and implicit MUS in community-driven employment creation and development projects. One characteristic of MUS is the cost-effectiveness of multi-purpose infrastructure as the rule (and single purpose as the exception). This has been proven extensively. Another characteristic, participatory planning and budget allocation to the outcome of that planning process, was also pilot-tested, leading to generic guidelines for planning and implementing MUS. Impacts are now starting to be proven or made plausible: tapping into the five capitals of communities' water wisdom and their investments and ensuring sustainability by addressing own priorities and providing technology choice.

Lastly, the paper draws lessons from past efforts to **upscale** MUS. This happened through "scaling partners" at each of the entry points: the WASH sub-sector and the irrigation sub-sector (which keep their mandated priority but expand to other priority water uses as well), general water projects, and general community-driven development programs in which communities prioritise water projects. Local government structures in "the messy middle," where top-down siloed support needs to be matched with bottom-up integrated needs, appeared particularly relevant for wide and sustainable upscaling. Upscaling also implied unravelling relationships between MUS and broader discourses: IWRM, water security, climate resilience, accountability in public service delivery, and most recently, a human right to water for livelihoods.

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Keywords: innovation, proof of concept, best practices, upscaling

Multiple-use Water Systems (MUS) – iDE's Approach to Design, Development, and Impact

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Abstract

This paper draws on 15 years of multiple use water systems (MUS) development efforts by International Development Enterprises (iDE) and its partners in order to describe different MUS designs and their application, management, and impact within farming communities in the hills of Nepal.

MUS are community-managed water systems located in water-scarce areas, serving small communities (15 to 80 households) for domestic (45 litres per person per day) and high-value agricultural uses (400 to 600 litres per household per day). Each MUS is designed to fit local conditions, depending on the level of water flow at the source, geographical limitations, water demand, and user preferences. MUS designs typically incorporate low-cost micro-irrigation systems that save water and increase crop production, especially during the dry season. The MUS infrastructure makes use of proven technologies such as ferro-cement and soil cement tanks that are low cost and easily constructed. System components, such as irrigation and drinking water taps, are designed with simplified construction methods utilizing less material than is traditionally used in rural areas. A key approach to ensuring sustainability of MUS is to organise rural households into a well-managed user group that can establish and maintain the system.

To date, iDE has developed over 280 MUS serving more than 60,000 people in Nepal. The construction of gravity-fed MUS costs an average of $115 per household – an amount that is usually paid back through increased income within the first year. Additionally, iDE – working in partnership with Renewable World – has developed five Solar MUS to bring water to communities at higher elevations, serving over 1,250 people. A recent IWMI study (2014) of 7 gravity MUS systems over 10 years old confirms that the iDE Nepal MUS is highly sustainable, with a benefit-cost ratio of 11 to 1, considering only direct income from increased agriculture. This income is key to financial sustainability, with a portion of the increased income used to pay for a MUS caretaker, system repairs, and the protection of water sources and watersheds. The increased income also creates strong incentives for users to continue proper management of the system.

The MUS approach is cost effective, improves community governance of scarce water resources, helps smallholder farmers to improve rural health and livelihoods, and promotes gender equity. The iDE MUS model has proven to be an appropriate and sustainable rural water supply model for smallholder farmers in the Nepali hills.

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Benefits of MUS on Livelihoods and Sustainability of Drinking Water Schemes

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Abstract

An analytical study was conducted on how multiple use water systems (MUS) benefit the community in terms of sustainable services and livelihoods. This study compares the benefits of 20 MUS supported by Rural Village Water Resources Management Project (RVWRMP) against the same number of gravity-fed drinking water systems implemented in seven hill districts of the Far-Western Development Region of Nepal. Purposive sampling methods were used to collect data from the field.

The study concludes that development of MUS has ensured inclusive representation in local-level institutions (the users committee), strengthened community water governance, and created new income opportunities through farm-based livelihood interventions. In addition, users of MUS schemes demonstrated improved collection of operation and maintenance funds (more regular and increased sums), in comparison to water-supply-only schemes, making the communities better able to sustain their drinking water and sanitation activities.

The result obtained demonstrates the need for all actors to work together in the water sector to multiply the benefit of their resources, highlighting the importance of MUS as a common priority in the water resources management sector for sustainable services.

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Key words: inclusive representation, income, sustainability, MUS, O&M

Solar Water Lifting Technology and MUS for Energy-Poor Communities: A Technical, Socio-Economic, and Financial Sustainability Approach for Upscaling Solar MUS

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Abstract

This paper synthesises some lessons learned and recommendations around the technical, socio-economic, and financial sustainability of the Solar MUS system. High-lift solar water pumping for multiple-use systems in Nepal is a new and growing solution for water- and energy-poor communities living above reliable water sources, where conventional gravity-fed systems are not feasible. Renewable World piloted several solar water lifting systems in five districts in Nepal and has gathered valuable information concerning their sustainability. This presentation highlights the outcomes and lesson learned from this pilot project and provides recommendations for upscaling Solar MUS as an appropriate technical solution for hill communities.

The learnings verify the long term sustainability of the system and suggest tools to address the challenges faced when establishing a functional and appropriate governance and management structure, which has been a key area of learning for the team, as is the need for an affordable and equitable tariff mechanism to ensure financial sustainability of the system. Establishment of a funding mechanism and willingness by a community to invest in the technology require development of a reliable technical solution for the community's water needs. Communities in turn need to understand the cost of the technology from an early stage and value the benefits from the system. Longer-term sustainability requires commitment from stakeholders to actively participate in and provide resources for project development. Another lesson learned is the need to establish and build the capacity of existing service providers at local and regional levels to ensure the technical sustainability of the system. It is also critical to ensure active participation and ownership from all members of the community, particularly women and youth, for the long term social sustainability of the system.

Incorporating the learnings from the pilot project, Renewable World has launched the Solar MUS II project in Nepal, targeting 19 more communities from the Mid-Western, Western, and Central Regions. It proposes to use a mixed financial model to ensure financial sustainability as well as to advocate for private sector investment.

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Are MUS More Sustainable than Single-Use Systems? Insights from Western Nepal

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Abstract

The concept of multiple-use water systems (MUS) has received increasing attention in international water and development fora and has emerged as a promising way to enhance the social and gender equity and productivity of water systems. MUS might also offer a promising alternative to address the low resilience of single-use systems implemented under external (foreign aid or public) interventions observed in Nepal and elsewhere. The research hypothesis for this study is that MUS systems might be made more resilient and sustainable by combining the provision of water services that cover basic needs with services supporting income generation, thereby generating different incentives and new opportunities for collective action.

This study was conducted as part of the USAID-funded Market Access and Water Technology for Women project (MAWTW) led by International Development Enterprises (iDE). It included a rapid appraisal of 16 MUS, implemented seven to ten years ago in Western Nepal, and an in-depth comparative case study of two MUS.

Research findings suggest that MUS are overall more sustainable than single-use systems in Nepal. A large majority of the MUS surveyed are still delivering water for multiple uses and have active formal institutions. The benefit-cost ratio is high, with a payback period of less than one year. The internal factors affecting sustainability were identified as the level of trust and reciprocity among water users, characteristics of the water resources, and characteristics of the infrastructure. The economic returns generated by vegetable production from MUS increase water users' willingness to protect the source, but they can also become a threat to the systems' sustainability when distributed unequally and unfairly among water users. Recommendations to enhance the sustainability of MUS and of small-scale water systems in general are to include an assessment of the social and institutional characteristics of the water users group in design of the infrastructure.

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Representing a Key Climate Change Adaption Mechanism: the Nepal Experience

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Abstract

MUS represent a highly cost-effective and important community-based climate change adaptation mechanism. Key climate adaptation aspects of MUS include:

(1) Enabling communities to more effectively allocate scarce water resources
(2) Enabling smallholders to earn a higher proportion of their income from a reliable piped irrigation source, reducing dependence on increasingly unreliable rain-fed agriculture
(3) Encouraging adoption of micro-irrigation and other technologies that save water and increase incomes
(4) Enabling HHs to purchase and produce nutritious foods through the dry seasons, protecting the nutrition of mothers and children during the critical 1,000-day period from climate related shocks and stresses.

In Nepal, MUS has become an important part of climate adaptation programs supported by UKAID, USAID, the European Union, and the government of Nepal. The Ministry of Population and Environment, which takes the lead in Nepal for climate change resilience activities, is currently developing MUS guidelines for government-supported climate change adaptation initiatives. iDE Nepal's experience designing and implementing 280 MUS suggests that they represent a critical climate adaptation infrastructure that can pay for itself in less than one year. In Nepal and in other countries, the MUS approach faces challenges due to the separation of investments for drinking/domestic water and for irrigation/productive uses of water. Climate change adaptation represents a key entry point for the MUS approach to be formalised with government and to reach scale.

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Achieving Sustainable Water Service through Climate-Smart MUS: an Experience from Far-Western Nepal

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Abstract

Sustainable functionality and operation of rural water supply infrastructure is a major challenge in Nepal. Challenges to sustainability include location in remote and hard-to-reach areas, single-use infrastructure service development without linkage to other activities, misuse of scheme investment funds, and traditional thinking regarding water utilization by the local population. This situation is further aggravated by the effects of climate change. Spring-shed deterioration, water-source depletion, and haphazard utilization of available water sources is creating social problems and setting back the livelihoods of poor people.

This paper reviews practical experiences of the Rural Village Water Resources Management Project, in which water systems are combined with other uses for available water (micro-hydro power generation, surface irrigation, improved water mills, animal drinking troughs, and micro-irrigation) for the well-being of the rural population. Sustainable basic livelihoods and consideration of climate change resilience/adaptation are combined along with local financial institutions, i.e. cooperatives for investment in operation and maintenance, so as to achieve a long sustainable service period.

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Keywords: Water Use Master Plan, Multiple Use Services, climate change adaptation, sustainable basic livelihoods, functionality

MUS Approach Application in the Context of Climate Change: Department of Irrigation Pilot Project to Adapt to Climate Change in Nepal

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Abstract

Nepal's Department of Irrigation promotes many types and sizes of irrigation systems in Nepal. The effects of climate change are being experienced by farmers in terms of both untimely rain and delayed rain. Similarly, temperature has an important impact on crop production. Delayed rainfall and low rainfall during winter have adversely affected the livelihood of farmers in all types of irrigation systems. Under these conditions, farmers are looking for alternatives to ensure a reliable water supply for crops at the tail end of large irrigation systems. In such locations, the MUS approach and multiple-use systems, which help farmers to use limited water to produce low-water-consuming high-value crops, may be good alternative.

The Department of Irrigation is undertaking a pilot project to introduce water-conserving methods in a command area where farmers are facing water shortages. Sindhupalchowk District will provide a useful example. Pressured drip and sprinkler irrigation systems are being planned, and a vegetable marketing network is being organised for this area.

The MUS approach can be an adaptive mechanism incorporated into medium- and small-scale irrigation systems to increase resilience to the effects of climate change. The unconventional irrigation program of the Department of Irrigation will benefit from the experiences shared in this workshop.

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Making MUS work for climate vulnerable farmers and sustain its outcomes: a case study of a village from Majhthana, Kaski, Nepal

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Abstract

Multiple use water systems (MUS) are a community-level intervention to maximise water use efficiency, thereby enhancing climate resilience against a backdrop of water shortage due to drought and erratic rainfall. In this case study we explore technical and non-technical aspects of MUS operation, to promote MUS as a component of climate-smart agricultural systems that maximise production, build climate resilience, utilise mitigation as a co-benefit, and improve workload and drudgery of women and poor farmers. Our preliminary observation of a pilot study at Bhurtel Gaun (14 households) of Majhthana VDC of Karki district found that the MUS approach works better when promoted through a package approach that includes MUS and MUS-linked climate-smart interventions such as improving production of farm yard manure and its use, diversifying species in home gardens, organic vegetable production, and social mobilization to build capacity of women and poor households. This package approach allows communities to improve their access to a wider set of stakeholders in order to access resources and market their products.

We learned that sustaining a MUS package requires local (community) ownership together with mobilization of resources from local stakeholders, including communities, the VDC, and other actors. In the pilot villages, in addition to in-kind contribution, the local communities have made 24% cash contribution, the VDC has made 7% cash contribution, iDE Nepal has provided technical expertise in cost estimation and design of the system, and LI-BIRD is covering the rest of the cost. The engagement of communities and other stakeholders through cash sharing has increased ownership of the MUS package at the community and stakeholders' levels. We found that the role of community groups and institutions also plays a vital role in ensuring good governance for management and timely completion and operation of the MUS package. In this context, farmer's groups have been identified as a grassroots institution that can ensure governance of a MUS package at the community level. This should be established through a formal agreement with the community/grassroots institutions, to institutionalise and integrate into their strategic planning processes.

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A Multi-Dimensional Perspective on Women's Empowerment through MUS

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Abstract

In the Far West of Nepal, the agricultural sector is undergoing social and climatic changes which impact water resource management. On the one hand, gender relations within households, the agriculture sector, and the community are changing due to the increasing out-migration of the young and male. On the other hand, agricultural and water resource practices are becoming adapted to greater variations in rainfall. In this context, reliable access to water is particularly important for Dalit women and other marginalised female farmers whose perceived position within the village is determined by social and economic divides such as age, marital status, caste, remittances, and land ownership. In this paper, I argue that a theoretical perspective depicting a multi-dimensional, relational, and process-oriented understanding of women's empowerment can be beneficial to discussions on the value and opportunities of MUS.

The study is part of the DfID-funded project Anukulan, which aims at building resilience and adaptation to climatic changes with multiple interventions, including multiple-use water systems (MUS). Empirical data from the two villages Latamandu in Doti and Selingi in Dadeldhura highlight how improved water access through MUS can influence female farmers' agency. This presentation will discuss how socio-cultural markers can become less dominant with equitable water access and the increasing role of agricultural knowledge and skills. When implementation strategies of MUS are well informed and address existing power relations within the village, MUS can contribute to women's empowerment in multiple forms.

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Impact of Multiple-Use Water Systems Intervention on Women's Empowerment in Doti District, Nepal

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Abstract

Multiple Use Water Systems (MUS) schemes have been implemented throughout Nepal, with the aim to provide water for domestic and irrigation use and vegetable farming, and to help generate income via vegetable farming. Currently, under the Market Access and Water Technologies for Women project (MAWTW), iDE has introduced MUS in three districts in Far-Western Nepal—Kailali, Doti, and Dadeldhura. Two MUS systems were established in the study villages Gajud and Gharas. Classes on vegetable farming, nutrition, and empowerment were also conducted. This paper examines the effect of this intervention on the places, spaces, forms of power, and ways to exercise power for women in two villages in Doti district. It also analyses whether changes in women's power help to challenge traditional gender and social roles through individual and collective action. Village mapping, power ranking, and focus group discussions as well as in-depth interviews were conducted with beneficiaries and key informants to gain a better understanding of the impact of the project. Training on empowerment and vegetable farming has added value to prior interventions and increased the visibility of women in the community. The MUS has eased water access constraints to an extent and has encouraged vegetable farming, but market access still remains a concern for the predominantly women farmers.

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Multiplying Benefits through Multiple Water Uses at the Local Level: Case Study of Multiple Water Use System in a Remote Nepali Village

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Abstract

Multiple water usage creates the possibility of multiple benefits, with significant livelihood implications at the local level. Critical to the functioning of a multiple use system is the institutional mechanism that organises and supports the water use and manages the activities relating to the MUS. This case study presents a MUS developed in the Labdhi Khola Irrigation System on Gwalichour village in Baglung District, in the western mid-hills.

Irrigation, powering a grinding mill, and micro-hydropower generation are three integral uses of water developed from the same source. The users have been successful at crafting a self-governing institution to manage these three uses of water. The irrigation canal was developed more than 20 years ago under ILO assistance, under the Dhaulagiri Integrated Development Project. Using the same source for hydropower generation has become a new innovation, developed by the users with their own initiative and resources. Separate user groups exist for irrigation and hydropower uses, while the grinding mills are operated by local entrepreneurs. An institutional infrastructure has been created to coordinate the three uses at the local level. This institution has developed a unique set of rules to decide on membership for irrigation and hydropower uses.

The case study analyses the local benefits created through multiple water use at the local level and its livelihood implications. The analysis focuses on the creation of local institutions to coordinate the multiple uses for water, which demonstrates an alternative model of self-governing institution at the local level.

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Keywords: multiple water use, irrigation, hydropower, grinding mill, self-governing institution

Water Use Master Plan: An Effective Planning Tool to Maximise Water Productivity for Enhancing Rural Livelihood and Wellbeing

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Abstract

Community participation in water resource planning is important for promoting good water governance. It enhances equity and ownership at community level in planning and implementation, and it improves the sustainability of water services and utilization of precious resources. Disputes over water sources, depletion/drying of the source yield, and effective and efficient use of existing water sources are emerging challenges in rural areas of Nepal. To address such emerging issues, the Water Use Master Plan (WUMP) approach has been developed and practiced since 2001 in more than 200 VDCs of Far- and Mid-Western Nepal.

The WUMP is a process-oriented approach to holistic, participatory, and inclusive planning based on the integrated water resources management concept at the local level. It explores water provision for both domestic and productive uses and provides the opportunity to address poverty and promote better livelihoods through decentralised governance. The WUMP enables the community identify the total water budget in a VDC and to prioritise potential best uses. Multiple use water systems (MUS) are promoted wherever feasible. The WUMP fosters effective, equitable and efficient use of water at the local level and helps minimise water conflicts. It provides a common platform for the local community, including disadvantaged groups, and empowers them to claim their right to equitable sharing of water within and between communities. The WUMP approach emphasises identification of all water sources at the VDC level for MUS and implementation of the schemes. This article reflects the WUMP approach as a planning tool for MUS implementation.

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Keywords: Water Use Master Plan, Multiple Use System, community participation, equity

Integration of MUS into Local-Level Water Use Master Plan (WUMP) Considering Upstream and Downstream Linkages in the Koshi Basin of Nepal

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Abstract

This study finds multiple-use water services (MUS) to be one of the major priorities of local communities in the WUMP piloted sites of the Koshi basin of Nepal. Since 2014, ICIMOD in collaboration with HELVETAS Swiss Intercooperation has initiated a water use master plan (WUMP) as a pilot study at catchment scale in three Koshi basin districts: Sindhupalchowk, Sindhuli, and Saptari, representing mountain, mid-hill and terai respectively. Agriculture and livestock are the main option for livelihoods and the primary water-demanding sector in the pilot sites. Rain-fed cereals are predominately grown with low productivity, and unavailability of reliable water restricts vegetable and high-value crop production, even though the market is not really a constraint in the study area. The future of water use is made more complex and challenging in this area due to the lack of a water use plan, the increasing impact of climate change on water, and conflicting interests of water users and diversion of water into a single sector. WUMP involves a participatory approach whereby local people prepare plans for water use for various purposes such as irrigation, drinking water and sanitation, agriculture, and disaster risk reduction. Water availability, sectoral water demand, and scientific information (mainly hydrological parameters such as rainfall occurrence) are considered during planning, which will be helpful in designing robust MUS specific to a particular catchment.

This study is based on a recently conducted household- and cluster-level socio-economic and technical survey, as well as ward and VDC level meetings and focus group discussions in the selected catchment area of Sindhuli and Saptrai districts. These were conducted during WUMP preparation. The Sindhupalchowk case was not considered due to incomplete information resulting from the recent earthquake.

The preliminary results show that MUS is prioritised both at the community level and for individual schemes. At the community level, the conflicting interests around water resources can be resolved through incorporating MUS as well as an upstream and downstream negotiation process, for example considering water for fisheries and irrigation. At the individual scale, rooftop water can be used for domestic purposes, and waste water can be released for kitchen gardening.

The study also brings fresh insights from the terai area, where conjunctive use of ground and surface water is possible for irrigation. The multiple water uses involve multiple users and stakeholders and strengthen existing local institutions such as the V-WASH-CC, which contributes to strengthening of the upstream-downstream linkage. The study strongly suggests a need to integrate MUS into WUMP planning and to upscale the approach in the adjoining ecological zones of the Koshi basin. The cost and benefit of integrating MUS into the WUMP schemes can be a further scope of this research.

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Keywords: multiple water use services (MUS), water use master plan (WUMP), upstream and downstream linkage, Koshi basin

Soil-ferro cement water retention ponds for individual households

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Abstract

Soil-ferro cement ponds with ferro-cement lining complement rooftop rainwater harvesting jars at the household level by adding storage facilities to retain overflow and waste water from the jars as well as from additional roof catchments. Although generally attached to rainwater jars, rooftop rainwater harvesting systems with soil-ferro cement ponds can also be implemented as a stand-alone technology to enable small-scale irrigated agriculture and to provide additional water for livestock and sanitation purposes in water-scarce areas. When implemented independently, water from spring sources may be tapped instead of or in addition to rainwater. Most of the households make use of stored pond water by cultivating small vegetable gardens.

The designated pond volume of 3 m^3 is based on irrigation water supply requirements for a kitchen garden of 50 m^2. To reliably fill and utilise the ponds to their maximum storage capacity of 3 m^3, the roof catchment area attached to the pond should span at least 8 m^2, thus providing—on average—30 litres per day. To facilitate irrigation projects on a community level, larger soil-ferro cement ponds with storage volumes of 6 or 10 m^3 my be implemented. In this case, pond dimensioning is guided by the amount of surplus water (e.g. from gravity flow schemes) and the area of the land to be irrigated.

While ferro-cement is more expensive, it also makes for a more durable pond lining than plastic varieties, which become especially vulnerable if ponds are left empty. The ferro-cement lining minimises seepage and requires little maintenance. Despite small pond size, the soil-ferro cement ponds are an important tool for growing seedlings in the dry period so that off-season vegetables can be planted during monsoon in the hills of Nepal. Moreover, household-level ponds also contribute to better sanitation, hence are much in demand in rural communities.

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Learning from Best Practices and Approaches of Community Management of MUS

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Abstract

Understanding the usefulness of MUS and the value of the community's contribution to maintenance and sustainability help community members to become meaningfully engaged in the process of establishment of the project. Ownership by the community is always a key to sustainability. A community will own, manage, maintain, and sustain a system if they are involved in the entire planning process from the outset.

The current process involves the community as and when needed. Their ignorance and their financial illiteracy is a challenge to organizations facilitating such projects. Instead of educating communities and then mainstreaming them in the process, we begin the process and then do the project *for* them, assuming that they are learning and will eventually own it. This does not happen all the time, and projects fail.

Samjhauta Nepal is directly involved in mobilizing the community and educating the users committee members in Navadurga VDC of Dadeldhura for the establishment of a Hydram (hydraulic ram) water pumping system. With only a very brief presence in field, we met with every household individually first, gathered them all in group, discussed the water situation and possible solutions, and described the Hydram, informing them that the community would need to maintain and sustain it, requiring continuous funding support from the community. All community members committed their contribution and involvement. Finally, they expressed that they are financially illiterate and needed capacity building on savings/credit and its management, so we provided them with that package of trainings. All community members are now doing their own financial management as well. We can learn from and replicate this success.

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Keywords: participatory planning, community ownership, capacity building, sustainability, funding, Hydram

Multiple Dimensions of Community Water Supply and Sanitation Systems in Ugrachandinala VDC, Kavrepalanchowk District, Nepal

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Abstract

The experience of rural water supply and sanitation services in Nepal reiterates a general lack of access to management and technical skills and materials that results in poor management by water users committees. Operation, resource mobilization, and maintenance remain major issues for community managed rural water supply and sanitation schemes. In this context, this study was undertaken to understand the operation and management practices of a functional scheme, evaluate its socio-economic contribution, and analyse the operational and maintenance issues. The study uses a descriptive research design. Qualitative information was collected through focus group discussions, key informant interviews, field observations, and informal meetings with water users and key functionaries of the rural water supply system. The collected information was substantiated through consultation with a representative from NEWAH (the organization implementing the system) and with a review of the literature related to operational and management aspects of rural water supply and sanitation in the national and global contexts.

The study found that community participation, with involvement of women and socially disadvantaged groups in all phases of the project, has made Kodarthulichaur one of the best-functioning rural water supply and sanitation schemes in Nepal. This community-managed system has been functioning independently for more than a decade. This has brought significant improvement to the rural community through improved water access and availability and reduction in disease. The time saved through improved water access and improved health has increased economic involvement of local people, especially women, in economic activities like vegetable production using overflow from the water supply scheme. A notable social contribution has been inclusion of socially marginalised ethnic groups in general community activities including operation and maintenance of the system. Despite its achievements, including improvements in effective management and a substantial socio-economic contribution, the scheme has weakness related to technical, financial, social, and institutional management. Lack of contingency planning for major repairs that seem to be required in the near future and inadequate financial and technical capacity are major issues. Effective and timely addressing of operational and maintenance management issues is necessary for sustainable functioning of the system and to maintain the goodwill established by the project.

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Keywords: community participation, resource mobilization, operations, maintenance, women, disadvantaged groups, contingency planning, sustainability

Gender-Friendly and Inclusive Community Participation to Promote Equity for Successful Micro-Hydro MUS Implementation and Post-Implementation: Experiences from Far-Western Nepal

Author: Roshan Bikram Shah*, Technical Officer, Rural Village Water Resource Management Project (RVWRMP)

Abstract

Equity is the cornerstone of sustainable development. The planning and preparatory phase of micro-hydro MUS should include gender-friendly community participation with social inclusion. The implementation phase of micro-hydro MUS is most critical, and without wide participation, transparency, and inclusiveness during this period, the project will be impossible to complete. During post-implementation of micro-hydro MUS, there is a possibility for development of large numbers of micro-enterprises as end users, and for maximizing efficiency of irrigation water for crops that become raw materials for the micro-enterprises. The irrigation facilities increase the productivity which is the input channel for micro-enterprise; the productivity of micro-enterprise increases which is output channel.

The productive use of water and energy must be linked with gender friendly community participation to promote equity for the successful micro hydro MUS post-implementation phase. The generation of electricity creates the livelihood opportunities at local level in the rural poor community. The economic and leadership opportunities for women in micro hydro MUS are the real benefit observed. This paper analyses the gender friendly and inclusive community participation of seven numbers of micro/pico hydro MUS implemented through RVWRMP in its working VDCs. The generation of 259.5 KW power output and irrigation facilities of 164.4 hectare land through seven numbers of micro hydro MUS has created the multiple benefits and opportunities for the community. This paper also highlights the productive end use of electricity with equitable and inclusive exploitation for benefit of community people.

This paper highlights the importance of gender friendly and inclusive community participation for the successful implementation of micro-hydro MUS. This paper highlights the strength of gender equity and social inclusion in micro hydro MUS and also analyses the gap for further recommendation at policy level.

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Keywords: participation, transparency, gender, inclusiveness, equity, end use

Strengthening User Committees and Generating Income Opportunities for Sustainability of the MUS at the Rural Level: A Case Study of Dada MUS, Darchula, Nepal

Author: Indra Raj Badu*, Sustainability and Institutional Development Specialist, Rural Village Water Resource Management Project II (RVWRMP), Nepal

Abstract

Optimal use of limited water resources is important in the rural hill areas of Nepal and must take into account decreasing water sources due to climate change. Sustainability of the water supply while maintaining adequate service level is a challenge in rural communities. Engagement and activity levels of users and users committees are major factors for successful management and sustainability of MUS schemes, with specific consideration of ownership, participation, transparency and users' own approaches. Generating income opportunities from the water system contributes to improved living conditions of its users. External facilitation is needed to build local capacity for proper management within the users committees, and to help users generate income opportunities to add value following construction of water infrastructure.

This study highlights the efforts of the users and users committee at the Dada MUS, Darchula, which is managed for drinking water and irrigation by a small community of 23 households. This is one of 28 MUS schemes supported by RVWRMP in the Mid- and Far-Western regions. Generating economic value for water through income opportunities is fundamental to ensure optimal use of the water. Insights of the study are based on capacity enhancement and external facilitation to promote changes in lifestyle, cropping pattern, food habits, linkages, and users' satisfaction after establishment of the MUS system. Establishment of the operation and maintenance fund and the willingness to contribute to the fund is related (though not entirely) to the economic condition of the users. Income opportunities for the community and satisfaction with regular water services increase users' willingness to pay the water tariff.

The discussion is framed around three areas: users' approaches for managing operation and maintenance, external facilitation for capacity building, and income opportunities to build capacity to pay into the operation and maintenance fund.

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Observed Changes in Multiple-Use Schemes: A Revisit to the Schemes

Authors: Dhruba Pant* and Kamal Gautam, Consultants

Abstract

An initial assessment of the Smallholder Irrigation Market Initiative (SIMI) project, which developed 9 multiple use water schemes that supply water for both household use and irrigation, was done in 2005 by the authors for International Water Management Institute (IWMI) and International Development Enterprises (iDE) to document experiences and propose action for major upscaling. The assessment focused on the intervention strategies, the governance of the scheme including gender roles, and the changes wrought within the household. A revisit to two of the systems in Syangja and Palpa was carried out in 2016 to examine the present status of the schemes and to observe changes brought by intervention on social-institutional and economic aspects considered to be important from the MUS perspective. This paper will document the changes observed in these aspects, based on focus group discussions and key informant surveys.

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Community Empowerment through Rainwater Harvesting Design: A Participatory Experience in the Ecuadorian Central Highlands

Authors: Silvia Quarta, Fluid Foundation; Jorge Merino, Fluid Foundation; and Cecilia Borgia, Fluid Foundation

Abstract

Small farmers living in the Central Highlands of Ecuador face many water-related challenges: seasonal rainfall has become more unpredictable and scarce due to climate change, with severe impacts on agricultural activities, nutrition, and family income. At the same time, the public water supply is incomplete and unreliable in both quantity and quality of water. This results in an extra burden for women, girls, and boys who are responsible for fetching water from springs located sometimes at several hours' walking distance. Based on field research conducted from February to April 2015 in Basquitay, Riobamba, this paper presents opportunities and limitations in the participatory (re)design of rainwater harvesting systems for domestic, livestock, and irrigation purposes. A learning-by-doing approach, 'Katalysis,' which promotes experience as a fundamental starting point of a learning cycle, was tested in this context as a method to boost heuristic discovery, conceptual analysis, and knowledge sharing.

The fieldwork demonstrated the complexity of creating spaces within the social organisation of an Andean community, in terms of both time and interest, especially when material support is not offered. One of the main challenges involved giving voice to women in the design of rainwater harvesting systems in a community where decision-making mostly lies in the hands of men.

Empirical experiments and group learning were undertaken with a selected group of women. Through practical experience, and encouraged by external facilitation, they became more self-confident, eventually presenting their discoveries in front of the whole community and external organisations. Together with the identification of a cost-effective and locally adapted rainwater harvesting prototype, this represented a first step toward empowerment. The Katalysis approach showed a great potential in engaging community members, especially women, in development processes. However, this approach needs time and a type of support which may fall outside the modalities of output-oriented donor financing schemes.

Importance of Linking MUS with Agricultural Development: the Nepal Experience

Author: Luke A. Colavito, Country Director, iDE Nepal

Abstract

A key aspect of multiple-use water systems is their ability to increase income through production of high-value crops. The increased income in turn makes MUS more sustainable (Clemente 2015). In order to increase agricultural income in MUS communities, it is critical to develop agricultural value chains that provide MUS community smallholder farmers with access to markets, inputs, equipment, and embedded training services. iDE's approach in Nepal is:

(1) To jointly develop MUS and smallholder commercial pockets that create sufficient volume of production to establish community managed collection centres, providing farmers access to markets and a variety of services, as well as linkage to government programs
(2) To assist the private sector to establish service providers based in the MUS community, in order to market inputs and equipment while providing embedded training and support.

Rural collection centres play a key role, working with their members to develop and support scaling of the MUS approach. MUS in turn play a key role in making rural collection centres profitable, increasing the volume of production and enabling production throughout the year during the dry seasons. Over the last 15 years, iDE Nepal has developed more than 280 MUS serving over 60,000 people linked to commercial agricultural development. An IWMI study of the MUS that were 7 to 10 years old found MUS to be much more sustainable than single-use drinking water systems, with a benefit-cost ratio of 11 to 1.

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South Africa: MUS Pilot Projects Sekhukhune and Vhembe districts, Limpopo Province

Authors: Kenny Phasha, Tsogang; Barbara van Koppen, IWMI and Global MUS Group; and Virginia Molose, The Mvula Trust

Abstract

Tsogang is a South African NGO that has been involved in water projects that were initially planned for domestic uses only. When communities saw water, they started household gardens and small-scale enterprises like car washing. This led to over-use of the system. As part of after-care, Tsogang augmented the springs and piped gravity flows. Based on this experience, Tsogang's vision is that MUS can work in South Africa, notably in hilly areas, and that the MUS approach should be rolled out. This is particularly important given the recent and predicted major drought.

South Africa is the first country in the world to formally promote a water services approach that meets poor people's domestic and productive uses, at the highest policy levels of the legally binding National Water Resource Strategy (2013). The challenge lies in implementation. Therefore, an action-research project is being launched, in which Tsogang is the implementing partner to pilot a participatory, community-led planning approach to MUS in six villages in Vhembe and Sekhukhune districts, Limpopo Province. The approach builds on what communities have already been doing and begins with a bottom-up needs assessment. This is a project of the Water Research Commission, supported by the African Development Bank. IWMI is the knowledge partner. The project collaborates with existing structures and planning processes, including the elected councillors, local government, universities, department of agriculture, department of water, etc. from local to national level. The approach is to strengthen the Integrated Development Plans of the local and district municipalities. The joint learning process ensures the replicability and sustainability of the approach, also for significant after-project investments by the same structures.

Institutionalization and upscaling the MUS approach in Western Nepal?

Authors: Sanna-Leena Rautanen*, Chief Technical Advisor and Ritu Prasad Chaulagain, District WASH Advisor for Baglung district, Rural Water Supply and Sanitation Project in Western Nepal Phase II (RWSSP-WN)

Abstract

The bilateral Rural Water Supply and Sanitation Project in Western Nepal (RWSSP-WN), supported by the governments of Nepal and Finland, works with the local governments in 14 districts. This study explores possible drivers and barriers to institutionalizing and upscaling MUS at the intermediate level, i.e. the local government and decentralised context. The study was based on 20 statements scored by 22 district and project staff members at three analytical levels:

(1) individual
(2) organizational/institutional
(3) enabling environment.

The findings suggest that MUS needs to be conceptually more clear and better advocated, both in terms of technical options and in terms of the water *services* delivery paradigm. The study concludes that in regard to enabling environment, MUS choice should be made "convenient," not something rare that require "a lot of explanation." Cross-sectoral context adds institutional complexity, while livelihoods open up many options. In regard to human resources, capacity at all levels counts: a critical mass of aware and skilled people is needed. Related participatory approaches and capacity development interventions need to have a vision that goes further than just the present state of affairs and single sector and service, beyond merely completing the scheme. Appreciating the complexity and dynamic nature of the rural water sector, this paper provides a number of recommendations applicable for those working with local governments and communities to integrate and scale up MUS. The rural water sector must pay attention to rural livelihoods and cross-sectoral issues to truly benefit rural development and well-being.

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Keywords: water services delivery, enabling environment, cross-sector, institutionalisation

MUS Approach Framework for Institutionalization: Scaling up of MUS in Nepal

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Abstract

MUS have gained recognition as an approach to water services that meet people's needs in rural and peri-urban areas. The MUS approach focuses on direct benefit to households. Physical, socio-economic and institutional context influence the mode of implementation. Research findings have concluded that specific conditions must be fulfilled for successful implementation of MUS. Broadly, there are two categories of MUS strategy: homestead, focusing more on the household level, and community, encompassing larger number of users. Different types of water sources are used for the promotion of MUS, including rainwater harvesting, surface gravity flow, and ground water. Hence MUS is sensitive to social, institutional, and physical conditions, and implementation requires careful planning specific to the location and community.

In this presentation, an attempt is made to map out the institutional setting in Nepal for the promotion and upscaling of MUS. The legal and institutional arrangement in Nepal is still a sectoral approach to water resources utilization. At present, MUS in Nepal is in project mode, and implementation must be transformed into program mode. Research findings have shown the sustainability and enormous economic benefits of MUS in rural areas. MUS upscaling and institutionalization requires careful strategic planning and effective advocacy by concerned stakeholders, and should include:

- Advocacy for conducive legal and institutional frameworks
- Encouragement of adoption of an integrated approach rather than sectoral approach
- Identification of a government agency with responsibility to promote, expand, consolidate, and stabilise the MUS approach
- Promotion through local government, citizen's organizations, educational institutions, and training programs
- Formation of a MUS advocacy network at district and national levels.

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Keywords: community planning, advocacy, legal framework, institutionalization, promotion, MUS network