RiPPLE
briefing paper

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MUSgroup

Multiple-use Water Services (MUS):

Cost-effective water investments to reduce poverty and address *all* the MDGs

Key points

- MUS is a service delivery approach that works within an integrated water resource management (IWRM) framework to provide water services that meet the multiple livelihood needs of users.
- MUS brings multiple benefits which contribute to achieving all the Millennium Development Goals (MDGs)
- MUS is a cost-effective approach, despite increased initial costs, and improves scheme sustainability
- Scaling up MUS requires an enabling environment that promotes inter-sectoral working and participatory planning. This demands a shift in current practice.

What are multiple-use water services?

Multiple-use Water Services (MUS) are water supply services that incorporate both domestic and productive uses in their design and delivery. It is argued that by installing or upgrading systems to make them suitable for multiple use, some 220 million people in sub-Saharan Africa (about 52% of the rural population) could significantly benefit (Faures et al, 2008).

The premise behind MUS is that people's livelihoods require water for a variety of purposes. As well as drinking, washing and cooking, rural households across the developing world typically use at least some water for livestock, irrigation, home gardens or other small-scale productive uses, whether or not water supply schemes are designed to provide for this (Moriarty et al, 2004). MUS aims to supply water appropriately for all these different demands within an integrated framework. While traditional systems tend to focus on improving health or agricultural productivity through single-use domestic or productive services (e.g. irrigation), MUS applies a wider livelihood perspective to water services.

What does MUS look like in practice?

There are three main ways in which MUS can be implemented:

1. Upgrading by installing an 'add-on' to an existing system
2. Single-'plus', in which a single-use system is designed to allow for subsequent phased expansion (e.g. irrigation 'plus' or domestic 'plus')
3. MUS by design where services are designed for multiple use from the start

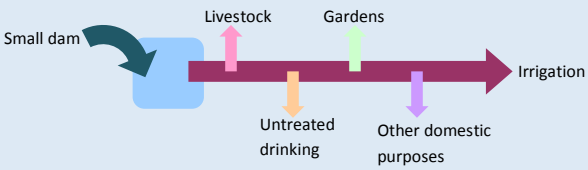
Upgrading

Upgrading starts from an existing improved water supply scheme, designed for single use, and incorporates new components to make the scheme suitable for multiple uses. Many systems are already used for purposes they were not designed for: people may collect water for drinking from the filling point of a reservoir and water livestock from irrigation canals, for example. Upgrading means adapting the system to meet these needs more safely, conveniently and effectively, for instance adding a domestic tap stand and cattle trough to an irrigation system. Upgrading can also involve introducing entirely new uses, for example irrigation-tank based fisheries.

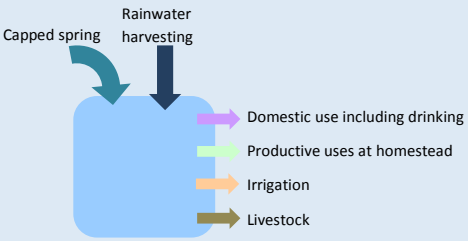
Single-'plus'

Single-'plus' approaches are similar, except that the upgrade is planned for from the start. This staged approach may be used when a lack of resources or buy-in at the start of implementation prevents full MUS being developed, but implementers wish to adapt the system to MUS after a period of fundraising or awareness-building.

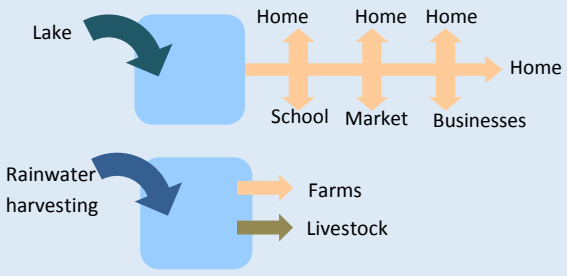
Figure 1: Examples of MUS situations



De facto multiple use: A system, fed by a single source, is designed for single use (such as irrigation), but people use it for other purposes.



Multiple-use reservoir: A reservoir is fed through multiple sources and water is distributed to meet multiple needs.



Multi-purpose, multiple source: Network with distribution for different uses, from available sources providing differing water qualities.

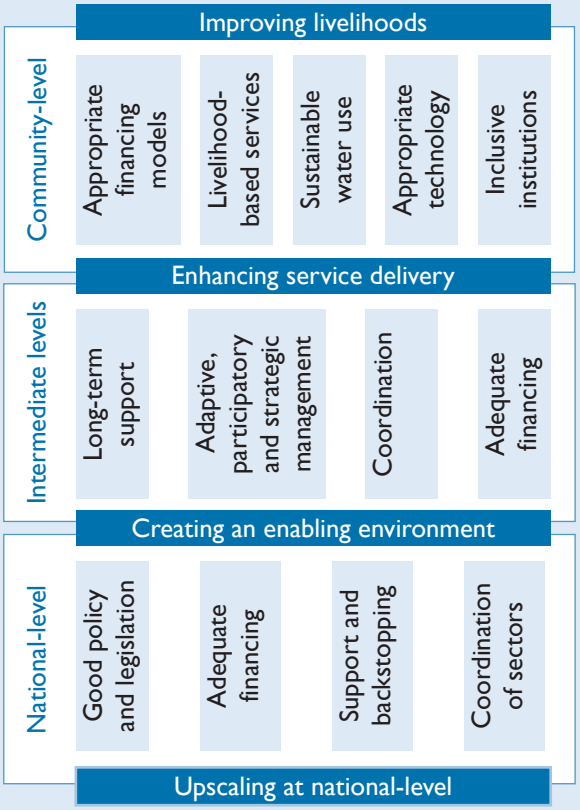
MUS by design

MUS by design means that water supply for different uses is designed in an integrated way from the start. This requires a detailed understanding of water demands in the target community, including quantity and quality needs and information on when, where and how needs are to be met. For example, a traditional single-use domestic water scheme might be designed to provide 20 litres per capita per day (lpcd) of safe drinking water, based on standards set under global initiatives. However, households may in fact use only 5 lpcd for drinking and cooking, and use the rest for cleaning and washing – activities which do not require potable water. Additionally, some may collect water from the scheme to water a small vegetable plot. A MUS scheme for this community might provide smaller quantities of potable water, but make larger volumes of lower quality water available for household gardens.

MUS is best thought of as a service delivery approach rather than a type of scheme. There is no standard design as both supply factors (including the nature and location of water sources, available technologies, topography, and land ownership patterns) and demand factors (population and distribution of users and their water demands) will vary.

MUS is not only applicable at community level, but can be adopted as an approach to water service delivery up to national level. It relates closely to concepts of

Figure 2: Levels and pillars of MUS



Source: Adapted from Van Koppen et al 2006

integrated water resources management (IWRM), and provides practical approaches through which aspects of IWRM can be operationalised. Figure 2 illustrates the 'pillars' or steps which form part of MUS at different levels. Creation of a suitable enabling environment and investment at national level will be needed for wholesale scaling up of MUS. At lower levels, taking steps towards MUS can both benefit communities and contribute to driving policy change, by demonstrating the operationalisation and impact of MUS.

Benefits of MUS

Multiple uses for multiple benefits

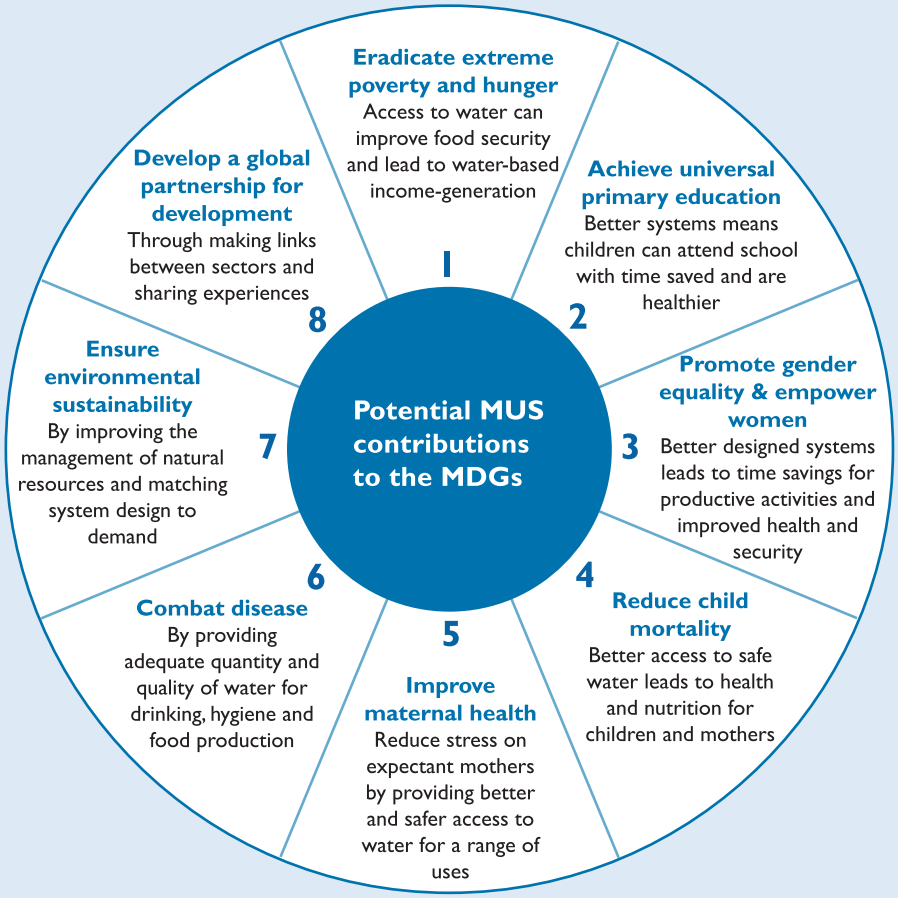
By taking a livelihoods perspective and designing services which provide explicitly for actual demands on water – both domestic and productive – MUS seeks a comprehensive impact on the multiple dimensions of poverty.[1] The multiple benefits which result suggest that MUS has a role to play in achieving all eight of the Millennium Development Goals (see Figure 3). Providing for safe drinking water, small gardens, livestock and farming simultaneously, for example, will both increase productivity and time-savings, which in turn improve household health and food security and reduce vulnerability. This could be measured in terms of greater poverty impacts 'per drop'. A range of case studies in Asia and Africa (including Harischandra, 2008; Adank et al, 2008; Khawas & Mikhail, 2008) have reported benefits in income generation, nutrition, health, crop production, livestock holdings, livestock health, time savings, access to sanitation and intra-household gender equality, as well as improved water management practices.

Cost-effectiveness

Not only does MUS bring significant poverty reduction benefits which could contribute to achieving the MDGs, but it has been shown that these greatly outweigh the additional costs of MUS over single-use systems. According to a global analysis of a large number of case studies, cost-benefit ratios[2] of potential MUS action 'opportunity areas' range from 2.9 to 27 (Renwick et al, 2007). A study in Ethiopia (Adank et al, 2008) found that the benefits of MUS greatly outweighed its costs at both household and system level, even in a hypothesised 'worst-case' scenario (see Figure 4). This was true for MUS by design, irrigation-plus and domestic-plus situations.

The use of 'smart' technologies can further enhance the cost-effectiveness of MUS. These are innovative or adaptive technologies that improve the efficiency of existing 'low' technologies at a lower cost than hi-tech alternatives, and can be constructed and maintained using local resources. Many of these technologies are particularly valuable for MUS because they increase the volume of water that can be supplied (e.g. rope or treadle pumps - see Holtslag & Mgina, 2008), use water more efficiently (e.g. drip irrigation methods), and reduce the burden of operation and maintenance on managers and enhance sustainability (because they can be repaired using locally available materials).

Figure 3: MUS potential for tackling all MDGs through an integrated approach



Sustainability

MUS should also enhance the prospects of sustainability of water systems at community level, because of the greater level of economic integration of systems within communities (Smits et al, 2008). Cost recovery and attention to maintenance is expected to be better than for conventional systems as services meet many livelihood needs which are important to users. Further, systems are less likely to be used beyond their design capacity, because service design is matched to demand and local water availability. This reduces the likelihood of scheme failure or overuse of the water resource.

Challenges in implementing MUS

Investment in design and management

Ensuring sustainability and effectiveness of services depends on negotiating competing demands at household, community and watershed level. This requires a collective and interdisciplinary effort at the three levels, as shown in Figure 2 (Williams et al, 2006). The MUS approach should be based on participation, knowledge sharing and negotiation from the outset. Questions about the sharing of costs and benefits, management of competing demands, preventing overuse of water sources, and achieving necessary institutional reform have to be addressed in the design process and should form part of community-level negotiations involving all potential stakeholders. Prior stakeholder consultation in design and planning is critical, as is the continued support of implementing agencies after system installation, as stakeholders take time to adjust to new management systems. Financial, technical and human capacities as well as institutional resource constraints should also inform decision-making.

Complex, multi-use arrangements also require flexible and transparent management structures (Ali et al, 2008). Developing management structures and norms appropriate to different contexts is part of initial planning and local knowledge must be brought into the design process from day one. This is particularly important where there may be tensions (which may be latent) among users over the distribution of water. Box 1 gives an example from Nepal.

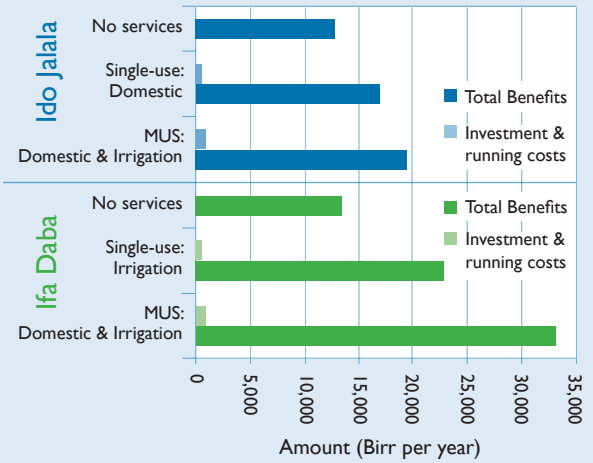
MUS systems are therefore likely to require a higher initial investment than single-use systems (see Figure 4). However, this is often lower than the combined cost of several different single-use systems. Running costs may also prove to be lower. Renwick et al (2007) argue that most communities can probably pay back investment costs within 36 months thanks to higher rates of cost recovery than for single use systems. This is a rather optimistic estimate, but cost recovery is expected to be better than for single use systems. In any case, higher initial investment must be offset against substantial benefits over the long-term.

Box 1: The case of Tori Danda

In Tori Danda village, in Syangia district, Nepal, a multi-disciplinary team spent six months consulting with communities to mitigate conflicting demands between upstream and downstream users and resolve cultural divides *before* hardware components were designed and installed. As a result after installation better management systems with good conflict resolution mechanisms had already been established.

From Khawas & Mikhail, 2008

Figure 4: Comparing costs and benefits of single-use versus MUS for two villages in Ethiopia[3]



The graph shows that whilst MUS has slightly higher investment and running costs than single-use systems, the overall benefits are significantly greater. It also demonstrates the effect of context (in this case, differences in water availability, irrigated land area and number of beneficiaries among others) on benefits gained from water services.

Source: Adank et al, 2008

Policy environment

In some countries the policy environment may not be favourable to MUS, particularly where inter-sectoral ways of working are not the norm. In Nepal, for example, MUS projects are hampered because national policy demands that cost-benefit analyses of irrigation systems reflect benefits of productive uses only. An irrigation 'plus' system would generate a negative cost-benefit ratio as benefits of domestic use are ignored. In a situation such as this, adjusting national guidelines is essential for MUS to be mainstreamed. However implementers can still work towards MUS, by upgrading existing domestic systems, for example.

Trying to address poverty and tackle multiple MDGs through a single intervention, apparently 'owned' by the water sector, may be a challenge for many agencies unaccustomed to intersectoral approaches. Wholesale change will only be achieved over time, and requires institutional reform, a new mindset embracing a livelihood-oriented approach, and more collaborative ways of working.

However, implementers still can and should adopt a more livelihoods-based approach to water services in their programmes. Indeed, projects demonstrating the benefits and potential of MUS will be key to achieving policy change. Box 2 overleaf is an example from Ethiopia, where successful MUS projects are encouraging policymakers to shift towards an integrated view of water services.

Box 2: Influencing institutional reform

Hararghe Catholic Secretariat (HCS), an NGO working in Oromia Region, Ethiopia, undertook a shift in organisational policy in the late 1990s, from single-use, sector-specific service delivery to MUS and inter-sectoral collaboration. Through successful projects and participation in learning alliances, HCS has been able to influence policymakers in local government, as well as provide long-term, inter-sectoral support for communities. Sharing and learning forums have played a significant part in this process through enabling faster uptake of ideas, innovations through knowledge dissemination. While it has taken a decade to get this far, indicating that institutional change is incremental and long-term, the benefits are clear: more sustainable systems are in place and local government has adopted a more integrated approach to service delivery. Recently, MUS has been adopted as one of the main approaches to service delivery under the Government of Ethiopia's accelerated Universal Access Plan, designed to achieve 100% water and sanitation coverage by 2012.

Constraints on productive uses of water

MUS has the potential to enhance and expand productive uses of water, with high potential to enhance the incomes of rural households. However various constraints may limit the potential for productive water use, and these need to be borne in mind. Households may lack the assets or skills needed to engage in new activities, and market chains for inputs or outputs may not be in place. Investments in complementary activities such as marketing support, training and start-up credit (in cash or kind, such as equipment) may therefore be needed if MUS is intended to promote new activities for income-generation. Prior work to understand local market opportunities and the constraints faced by households is needed to design support packages. If water-based activities do not offer high potential to improve livelihoods, alternatives should be explored – another reason why intersectoral linkages are critical.

Physical water availability may also constrain the viability of water-based livelihood activities, particularly under climate change. A livelihoods-based approach to water services remains important even if households eventually have to move away from farming, however. Climate change is likely to be slow and it is likely that some water will still be used productively to make households less vulnerable to hydrological change.

Recommendations for practitioners

The following steps are recommended for those involved in water service delivery, to realise the benefits of MUS and address the associated challenges:

- Recognise MUS as a key option for water service delivery and document experiences: Sharing experiences of the benefits and challenges of MUS will enable more learning and enable more informed policy decisions to support MUS.
- Look at the potential for 'add-ons' to existing systems: Upgrading can be a cost-effective way to achieve the poverty reduction benefits of MUS.
- Be flexible in the use of per capita quantities of water when designing systems: Conduct participatory planning to understand actual demand for water for different uses and base design on this.
- Allow adequate time for participatory planning, negotiation among users and the establishment of effective management structures when implementing MUS: Implementers should also be prepared to support management institutions after implementation.

Recommendations for policymakers

MUS can work by combining existing tools for planning, implementation, installation, operation and maintenance of water services. However, establishing MUS as a service delivery approach at scale is likely to require changes in the national enabling environment. This includes policies, planning mechanisms, institutions and ways of working in the water sector and more widely.

The following recommendations for policymakers should help facilitate a shift towards mainstreaming MUS in service delivery:

- Recognise MUS as a key option for water service delivery: MUS has high potential to make a cost-effective contribution to poverty reduction and the MDGs, and can enhance the sustainability of water schemes.
- Recognise the poverty-reducing potential of investments in water: Better water supply as a 'route out' of poverty is generally ignored in Poverty Reduction Strategy Papers (PRSPs), despite significant potential.
- Mainstream participatory planning with communities in rural service delivery: This is mainly to determine needs (across different users and seasons), create a sense of ownership and to allow for appropriate management systems.
- Coordinate sectors and integrate planning through a 'development' coordinating body: Best practice emerging from the field indicates that a 'development' government body is usually best placed to drive forward participatory processes, to coordinate between sectors and to 'own' MUS project implementation and management.
- Enable the development and financing of integrated programmes between sectors: Running sanitation and hygiene awareness, natural resource management and agricultural extension programmes simultaneously with water service delivery offers a more integrated approach to meet livelihood needs.

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The MUS Group

In 2003, the MUS Group was established to advocate for MUS globally. At its second symposium in November 2008 (co-convened with the RiPPLE programme in Ethiopia), the MUS-Group addressed the challenge of turning existing practice into policy. This policy brief is based on the presentations, discussions and outcomes of the Addis meeting.
Visit www.musgroup.net

- Facilitate decentralised water supply and sanitation (WSS) implementation, and build management capacity at local level: MUS works at a local level, so needs to be managed and steered locally in order for communities and service providers to hold each other to account.
- Reconsider quantity guidelines for water schemes: Water sector guidelines and regulations on quantity needs should reflect demand for water for different uses (and of different qualities) beyond health requirements, and recognise the livelihood importance of water for productive activities.
- Promote and invest in 'smarter' technologies: Investment in the development and sharing of new technologies can make water provision more cost-effective. Technology guidelines should be flexible and allow for innovation, and good information should be made available to practitioners about available technologies.
- Facilitate learning on MUS: This could mean collecting information and experiences on MUS at national level, supporting research organisations, and establishing or supporting platforms such as learning alliances to link practitioners, researchers and policymakers.

Endnotes

[1] Dimensions of poverty include income, health, education and exclusion from access to resources and services

[2] Cost-benefit ratios are based on an evaluation of financial sustainability; impact on well-being, health, and social empowerment; scalability; and opportunities for leverage, testing and learning.

[3] Costs combine capital investment in assets; operating and minor maintenance expenditure and support costs. Benefits include health benefits; time-saving benefits and irrigation benefits. No water services means there is some availability of water for villagers, but no designed and implemented service.

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