Multiple Use Water Services in Tanzania
Scoping Study

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Cover Photo: Women gathered at a rope pump well.
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Abbreviations and Acronyms

AfDB	African Development Bank
AGRA	Alliance for the Green Revolution in Africa
DDF	District Development Fund
IDA	International Development Association
JICA	Japan International Cooperation Agency
KfW	Kreditanstalt fuer Wiederaufbau
IRC	International Water and Sanitation Centre
IWMI	International Water Management Institute
MASSMUS	Mapping Systems and Services for Multiple Uses of Water Services
MKUKUTA	Mkakati wa Kukuza Uchumi na Kupunguza Umasikini Tanzania
NAFCO	National Agriculture and Food Corporation
NWSDS	National Water Sector Development Strategy
PMO-RALG	Prime Minister's Office Regional Administration and Local Government
TASAF	Tanzania Social Action Fund

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Executive Summary

Multiple-Use water Services (MUS) is a participatory approach that takes the multiple domestic and productive needs of water users who take water from multiple sources as the starting point of planning, designing and delivering water services. The MUS approach encompasses new infrastructure development and rehabilitation as well as governance. This study assesses the barriers and potentials for scaling MUS in Tanzania. It identifies pathways to overcome the water sector's compartmentalization according to single water uses (either domestic, or irrigation, or livestock). Evidence elsewhere has shown that such holistic participatory services with multi-purpose infrastructure bring more livelihood benefits in a cost-effective manner. MUS is also more sustainable because it avoids damage from unplanned uses and aligns with the holistic water development and management of rural and peri-urban communities. For them, the use of multiple sources for multiple uses is obvious and the efficient way to develop and manage their water resources.

MUS scaling pathways depend on the starting point of public water services providers in governments and NGOs, in particular the sector's mandates and earmarks of funding. Interviews with key stakeholders and literature review identified significant potentials for scaling MUS in Tanzania from five entry points.

First, in a **domestic-plus** modality through the WASH sector, the priority for domestic water uses near to or at homesteads is maintained, but more water is provided for higher service levels to 'climb the multiple use water ladder'. Small incremental costs generate more livelihood benefits from livestock watering, horticulture, or other productive activities. The income generated enhances the ability to pay and scheme sustainability. Equity can be improved by better targeting the unserved, especially women, with higher service levels. For them the homestead is often the preferred, if not the only place to use water productively. The first proposed step for scaling domestic-plus in Tanzania is to initiate a **calculation of the incremental costs and benefits of the multiple use water ladder for the Tanzanian context**. This renders the concept of the domestic-plus modality more robust. The second step is **pilot testing domestic-plus** in a national learning alliance with donor support. Lessons from these two steps will corroborate advocacy for policy change so that the basket funding of the Water Sector Development Plan will widen up its current single-use funding earmarks to achieve more livelihood benefits than domestic uses alone.

Second, in a **productive-plus** modality with the irrigation and livestock watering sectors, add-ons like special outlets or canals, troughs, washing places, or bridges improve the access to water for livestock, domestic needs, brick making, etcetera. In Tanzania, the 'livelihood engineers' in the Ministry of Agriculture, Food and Cooperatives, already implement such practices at scale. The proposed first step for further scaling is to render these practices

more robust by **systematizing and formalizing these multi-purpose design approaches**. Further, the strong irrigation policy emphasis on participatory approaches through local government authorities will strengthen bottom-up demand for multi-purpose infrastructure. At the moment, engineering capacity of local government is scarce indeed. Therefore, a second step in scaling productive-plus approaches is collaborating with the water supply sector and **exploring the scope for synergies in engineering support through local government authorities**. Integration of 'water supply' and 'irrigation' engineering is cost-effective and could anyhow be more adequate. Tanzania's team of senior engineers would assess this. A third step in scaling productive-plus, also in collaboration with the WASH sector, is to develop a **holistic joint vision on equity in services and prioritization in water allocation**. Both water sectors encounter issues such as: the risk that productive uses 'steal' water for domestic uses; the issue that expensive treated water would be used for domestic and productive uses that can do with a lesser quality; the implementation of the legal priority for domestic uses; the current lack of targeted water services and legal protection for water uses that meet people's basic socio- economic human rights to food and livelihoods, in addition to domestic water needs. The outcome will enable consistency in pro-poor policies for targeting criteria for any water service delivery and legal prioritization.

The third high-potential entry point for scaling MUS in Tanzania is through **self-supply for multiple uses**. Investments in self-supply technologies from private markets are by water users themselves. This differs from the domestic- and productive-plus modalities, in which government or NGOs invest in infrastructure, which is usually communal. If users invest themselves, they use the technology as they want, which is often for multiple uses. Winrock International and partners through the iWASH project introduced this MUS modality in Tanzania by promoting market-led self-supply of low cost smart technologies for multiple uses. The rope pump seems particularly relevant for domestic and small-scale productive uses. It provides more water than other manual techniques and costs are significantly less than the upcoming cheap motorized pumps. Low cost water filters are also introduced to ensure the quality of the 3 – 5 litres water needed for drinking wherever centrally treated water is unavailable or ineffective because of recontamination. However, the poor may lack the funds to invest themselves. So the first proposed step in scaling MUS through self-supply is **accelerating the MUS approach of iWASH and partners** and documenting how rope pumps, filters and other low cost smart technologies strengthen especially poor people's safe and productive water use. A second step is further **supporting eco-sanitation** as a self-supply option that optimizes the multiple uses and re-uses of the local cycles of water and nutrients *par excellence*.

Fourth, **community-based MUS** has unique and high potentials for scaling in Tanzania. Community-based MUS is fully participatory because people define their own priorities for

public support to improve access to water for multiple uses in their community, whether through communal or individual infrastructure. At community level, there is even more scope for efficient combinations of conjunctive sources and multipurpose infrastructure. Community-based MUS encompasses the three other MUS modalities. The first step in scaling community-based MUS in Tanzania is **to assess in-depth whether and how community-based MUS is *already* coming up in two large-scale initiatives**. One is the Opportunities and Obstacles to Development tool. This is developed for all local government authorities to implement their growing responsibilities for decentralized service delivery. The other is the Tanzania Social Action Fund for community-driven development, which has already reached half the population. Comparison of the water components of these two initiatives will lead to more conceptual clarity. The comparative assessment should identify solutions and best practices to better tap the advantages of integrated water planning for cost-effective multi-purpose infrastructure and sustainable conservation and harnessing of conjunctive water sources. The assessment should also explore solutions for the major challenge to scaling MUS, which is matching bottom-up integrated demands with either parallel sector-based and single-use funding streams from baskets (which is complex) or with untied funding (which is smooth). The assessment should explore how accountability systems to monitor public spending can move away from monitoring just one single use and livelihood benefit, as is done in sector-based funding. Instead, new criteria and procedures could be identified for accountability for public spending. Those can be: targeting the needy; transparent and inclusive planning processes with clear budget guidelines from the outset; and transparency in budget allocation with equitable and performance-related criteria. The second step is scaling this modality in every village in Tanzania, either by **supporting the implementation of community-based MUS in those two initiatives or by scaling through other water or rural development initiatives**.

Lastly, MUS can be scaled as **bottom-up IWRM** to complement and strengthen the top-down basin governance structures and water law of Tanzania's water resources management component. The first step is **a conceptual reinterpretation of IWRM in rural areas**. Instead of reaching out to all citizens from the basin boards downward or upward through yet to be established voluntary Water User Associations and (sub-) Catchment Management Committees, bottom-up IWRM starts with communities' age-old local integrated water development and management. This is already the formally recognized basis for participatory planning for service delivery; obviously, service delivery already encompasses major water allocation and quality issues. Local government authorities already are the country's democratic representation upward. Local government and line agencies already address interbasin issues at the appropriate higher levels. However, current interpretations of IWRM completely discard these practices and structures, both institutionally and legally. So the second step would be to **formally recognize communities' existing customary water use and law without burden of proof**. Water for any basic human

right would have highest priority in water allocation. Local government would be recognized as democratic representatives in basin institutions at whatever higher level needed. The extremely scarce basin-level resources can then be used to effectively regulate and tax the relatively few large-scale users who are the main causes of pollution and water over-use. Small-scale users are empowered vis-à-vis larger-scale users with considerable cost saving.

MUS is about cross-sectoral dialogue and gradual change from many entry points that all contribute to an overall vision. Therefore, it is proposed to implement these changes through a **national MUS learning alliance** of key stakeholders, including development partners. A national kick-off workshop can launch this process of networking, sharing of existing MUS practices and identifying pathways to further scale MUS in Tanzania. The national network can liaise with the global MUS Group for further exchange.

1. What is MUS?

Multiple-Use water Services (MUS) is a participatory approach that takes the multiple domestic and productive needs of water users who take water from multiple sources as the starting point of planning, designing and delivering water services. The MUS approach encompasses both new infrastructure development and rehabilitation as well as governance.

MUS emerged in the early 2000s when professionals from the water sub-sectors, in particular the domestic water, hygiene and sanitation (WASH) sector, and the irrigation sector began to see the untapped potential of providing water beyond the confines of conventional single-use mandates (Moriarty et al., 2004). Cross-sectoral action-research documented in more than 100 cases of MUS innovation in over 20 countries (www.musgroup,net; Van Koppen et al., 2009), economic analysis (Renwick, 2007), and policy dialogue in national and international forums, such as the World Water Forums in Mexico (2006) and Istanbul (2009), have confirmed this potential (Figure 1). Focussing on where sub-sector interests overlap leads to single-use sectors better achieving their own mandates while generating additional benefits. MUS offers three main advantages compared to single-use water service delivery models: 1) more livelihoods improvements, 2) more environmental sustainability, and 3) strengthened integrated water resource management (IWRM).

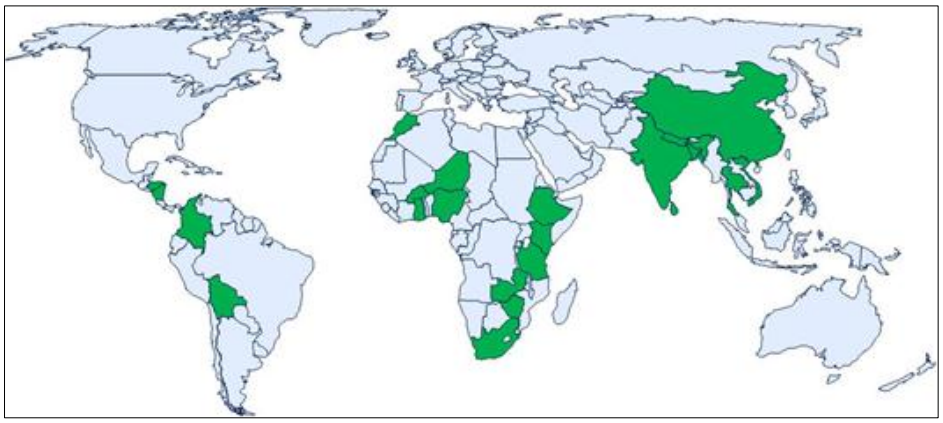

Figure 1: Countries where MUS has been applied

1.1 Livelihood returns

In terms of livelihood improvements, MUS concurrently improves health, food security, and income, and reduces women's and girls' drudgery, especially among the poor in rural and peri-urban areas where their multi-faceted, agriculture-based livelihoods depend in multiple ways on access to water. Livelihood benefits mutually reinforce each other. Thus, MUS gives 'the most MDG per drop' (Renault 2008). Livelihood benefits tend to be more durable because participatory planning empowers communities to articulate their own priorities,

thus enhancing ownership and willingness to pay for services. From the domestic sector perspective, adding income opportunities improves the ability to pay, hence, MUS unlocks new financing streams.

Livelihood returns from MUS investments are also more durable because they are holistic. People in many rural communities have practiced their own forms of 'integrated water resource development and management' for self-supply for many generations. Similarly, every water manager of a system designed for a single use has come to realize that people use a system for more than one purpose, planned or not. Prohibiting these other-than-planned *de facto* uses, for example by declaring such uses illegal, has typically been in vain. MUS turns the problem of unplanned uses into an opportunity to leverage investments, avoid infrastructure damage from unplanned use, and generate broader livelihood returns.

1.2 Environmental sustainability and justice

In terms of environmental sustainability and water efficiency, MUS recognizes that people use and re-use conjunctive water sources in ways that optimize, for them, the efficient development and management of rain, surface water, soil moisture, wetlands, and groundwater, and other related natural resources within their local environment. Even within the homestead, households can use up to nine different water sources, as found in Thailand (Penning de Vries and Ruaysoongnern 2010) Local knowledge and coping strategies for mitigating seasonal and annual climatic variability by combining multiple sources is at the heart of community resilience. Such efficiency and resilience will become ever more important as the impacts of climate change become more visible.

The MUS focus on the poor puts people and multiple uses at centre stage instead of casting allocation issues in terms of monolithic 'use sectors' that fail to differentiate between vested interests and multiple small-scale uses for basic livelihoods. Instead, MUS considers the distribution of water use by individuals, each with multiple water needs. Quantification of the distribution of water use is revealing. In rural South Africa, for example, 0.5 percent of users use 95 percent of the water resources. More than doubling current estimated water access by every rural user from 116 to 277 liters per capita per day would require the 0.5 percent large-scale users to share only six percent of their current water uses (Cullis and Van Koppen 2007). Focusing on the poor, MUS especially safeguards poor people's rights to water, food and livelihoods and their fair share of the resource in quantitative terms, and exposes poor people's greater vulnerability to unsafe water in qualitative terms.

1.3 A focus on community integrated water management

Last but not least, in opening up new livelihood and environmental opportunities, MUS recognizes that the natural intersection of multiple uses and multiple sources starts locally, at household and community level. MUS is bottom-up IWRM, starting with local users as clients and active participants instead of 'aid recipients'. MUS complements past IWRM

efforts in two new ways. First, while IWRM tended to be a 'push' from the top-down (e.g. by establishing basin organizations), MUS is a 'pull' for integration from below, where human well being and water resources are integrated.

Second, past IWRM efforts tended to prioritize governance over infrastructure development. The 's' in MUS stands for 'services' in the sense of reliably ensuring the availability of water in certain quantities and qualities, at certain times, and at a certain sites, during the full project cycle and after the construction phase. Services result from the appropriate balance between sustainable infrastructure investments and water governance. Infrastructure investments to harvest and store water in the rainy season for use in the dry season increase the pie of available water resources for all. This win-win solution reduces competition for water in open basins where there are still uncommitted water resources available for development. Yet, in many IWRM debates that focused on sharing an inevitably limited pie, this solution tended to be ignored. Obviously, infrastructure development is a precondition to improve access to and control over water for the 'have-nots', even if that implies that the 'haves' need to save water when basins are closing.

1.4 Key questions

In the light of these untapped livelihood, resource and integration opportunities, the key question is: How can scaling up be accelerated? The question has two sides: first, what are the barriers and constraints that currently limit the scaling up of MUS and what is their comparative importance? (e.g., financing, governance, policy, awareness, implementation capacity); and, second, what are the opportunities for scaling up MUS modalities in terms of scaling pathways, overcoming challenges, and potential key partner institutions? These are the questions the Rockefeller Foundation posed to the International Water Management Institute (IWMI), in collaboration with the International Water and Sanitation Centre (IRC).

1.5 Geographic focus

The geographic focus of the scoping studies is five countries where IWMI and IRC see strong potential for scaling up MUS modalities: India and Nepal in Asia, and Ethiopia, Ghana, and Tanzania in Africa (linked to the Alliance for a Green Revolution in Africa). The answers to these questions are presented in five stand-alone country reports and one synthesis report. The present country report discusses the findings in Tanzania.

The research objective and questions are elaborated next. This is followed by an analysis of empirical MUS related research in Africa and South Asia with the aim to further conceptualize scaling up of MUS for investigation in the five countries and to enable a structured synthesis of the results. The section on theory of change discusses four MUS modalities and related scaling pathways, i.e. 'what' can be scaled up. The chapter concludes with a section on the practice of change, i.e. 'how' MUS has been scaled in the past, and can continue to be scaled up through networking.

1.6 Study objective and questions

1.6.1 Objective

The objective of this study is to conduct country-specific research on the barriers that limit the scaling up of a multiple use services modalities to water management, the comparative importance of these barriers, and possibilities for overcoming these challenges for poor and vulnerable people in South Asia and Africa.

1.6.2 Research questions

- What are the different MUS modalities that have emerged, and how are they related to specific scaling pathways?
- What are the most important barriers limiting greater adoption of these modalities?
- What specifically could be done to overcome these barriers?
- What specific organizations are well placed to overcome these barriers?
- What geographic conditions would be most suitable for scaling up each kind of MUS model?
- What kinds of policy incentives are needed in each case?
- What kind of capacities and skills need to be built?
- What kind of information dissemination and engagement/partnership building needs to occur?
- What is the optimal sequencing of interventions needed to enable broader scaling up?

1.7 Theory of change: MUS modalities and scaling pathways

We define scaling up MUS as: better institutionalization of more robust MUS modalities and achieving a wider geographic spread. For people in rural and peri-urban communities, multiple uses from multiple sources is already a wide spread practice. The holistic development and management of multiple sources for multiple uses continues, both as multiple uses of systems designed for a single-use, and also as self-supply, whereby users themselves invest in the development and management of water sources for multiple purposes. These practices are often informal, sometimes without formal institutions even knowing about them. For people in many communities, the notion of 'MUS' is an articulation of what they do every day.

Scaling up MUS is primarily a matter of institutional transformation of water services delivery by government agencies, NGOs, financing agencies and donors, who conventionally structure their respective policies and water development programs into isolated and vertical sub-sectors (Van Koppen *et al.* 2009). Each sub-sector focuses on and budgets for the development of services for a single use, which is the sector mandate. This is often accompanied by pre-determined technologies and related management structures. Sub-sectors structure their accountability to tax payers and other financers by justifying their budget allocations according to their performance on a single livelihood dimension such as improved health through safe water for domestic uses, or improved health through

nutrition, or food security, or income. Formal professional training in colleges and universities is structured along similar lines. This compartmentalization, with vested professional interests, is the main reason for single-use services, and, hence, the main barrier that MUS proponents have sought to overcome.

The 'theory of change' adopted by most MUS proponents was to gradually channel existing institutions and financing streams towards MUS as a win-win strategy to better meet sector mandates while generating additional benefits. Accordingly, MUS proponents started addressing sectoral divides in essentially four ways or four 'MUS modalities' as shown in Table 1. This gradual channelling allows for leveraging of existing human, technical, institutional and financial resources.

The following description of the four MUS modalities is the 'ideal-typical' case. The precise content, relevance, current robustness and scaling potential greatly differ by country. Differences among and between modalities are a function of the entry point. They are not mutually exclusive but overlap and mutually support each other. Each modality contributes knowledge and resources to the common pool, which renders the whole more than the sum of the components. Ultimately, for example, the community-based MUS modality, in which community members articulate and negotiate the public water services they prioritize, would encompass all other three.

1.7.1 Domestic- and productive-plus modalities

The first two modalities are known as domestic-plus and productive-plus. Those who pursue these modalities work to scale up from within their own water sub-sector by widening the scope of public investments for their mandated single use to encompass other uses. Sub-sectors often subsidize capital investments in infrastructure, while communities are usually responsible for operation and maintenance. In +plus modalities, the implicit priority for either water for domestic uses near homesteads or crops in fields (or fisheries, or livestock watering) continues to be set by sub-sector professionals, not local users. Planning and budgeting from the top-down and a narrow range of options continues to be the norm. Planning remains 'formal' in the sense of strong involvement of government and public donors and NGOs closely collaborating with government.

Table 1: MUS modalities

MUS modality	Priority setting	Implicit priority use and site	Primary investors in infrastructure and funding earmarks	Primary scaling partners
Domestic-plus	WASH –sector, including local government, line agencies and NGOs	Domestic, near homesteads	Sub-sector, funding earmarked for domestic and some other uses, specific service levels, and often to a limited set of technologies; co-investments by users	WASH sector, with support for productive uses; sector working groups, and research centers, in learning networks
Productive-plus	Agricultural line agencies (irrigation, fish, livestock, trees), NGOs	The single productive use of the line agency, siting where appropriate	Sub-sector, funding earmarked for specific productive and some other uses; often a limited set of technologies; co-investments by users	Agricultural line agencies water bureaus, design offices and NGOs, with support for drinking water quality and other domestic needs; sector working groups, and research centers, in learning networks
Self-supply MUS	Users	Multiple uses, siting where appropriate	Users, limited by available technology choice	NGOs and private sector for technology supply, with support for drinking water quality, other domestic uses, productive uses and government support for market support, regulation; sector working groups, and research centers, in learning networks
Community-based MUS	Users	Multiple uses, siting where appropriate	Government or NGOs, with less earmarking of funds or with convergence; co-investments by users	Local government, with support of NGOs and line agencies; multiple sector working groups, and research centers, in learning networks

However, in the +plus modalities, the sub-sectors open up their mandate. This tends to happen in a step-wise fashion. The subsequent steps from single-use to multiple-use progress from: ignoring or denying non-planned uses or declaring illegal to: turning a blind

eye on these uses ('not my job') to: implementing marginal practices on the ground to accommodate multiple uses to: accommodating *de facto* multiple uses at management level to: fully integrating multiple uses from multiple sources in planning, design and use (Renault 2010). Especially in the WASH and irrigation sub-sectors, these +plus modalities have developed into fairly robust scaling models.

These steps were supported by valuation studies that identified the range of *de facto* uses and calculated the returns (Meinzen-Dick, 1997; Bakker *et al.*, 1999; Renwick 2001). In +plus approaches, the water sub-sectors are investors interested in all returns on their investments, instead of investors who may go so far as to criminalize livelihood returns only because they were not planned.

A strong argument in favor of +plus modalities is that relatively small incremental investment costs generate major livelihood benefits and avoid damage caused by unplanned uses. The benefit-cost ratio of these incremental investments is high, as confirmed by the in-depth financial evaluation of both domestic-plus and irrigation-plus scenarios conducted by Renwick (2007).

The **domestic-plus modality** builds on the water services ladder. While the WASH sector assumes that water quantities at higher service levels are still primarily, if not exclusively used for domestic uses, empirical research confirms that poor rural and peri-urban users in agrarian societies use and re-use water for livestock and other productive uses well below even basic service levels (see Figure 2). Similarly, studies have shown how higher service levels in terms of quantities, nearby availability and reliability lead to more productive uses. Hence, domestic-plus consists of providing higher levels of service, roughly doubling or tripling current supplies.

As domestic-plus modalities maintain a priority for meeting people's domestic and sanitation needs near to or at homesteads or residential areas, productive uses also tend to concentrate there. This site is especially relevant for women, who tend to have a stronger say over income from productive activities around their homes than from distant household production. Further, for the land-poor, sick and elderly, the homestead may be the only place where they are able to use water productively. Thus, the relatively small incremental improvements to domestic water supply systems result in relatively high benefits from small-scale productive uses, principally backyard gardening, livestock and home-based industries. Renwick (2007) calculated that intermediate MUS service levels of MUS at 50 to 100 liters per capita per day generate income which allows repayment of the infrastructure investment and operational costs within 6 months to 3 years.

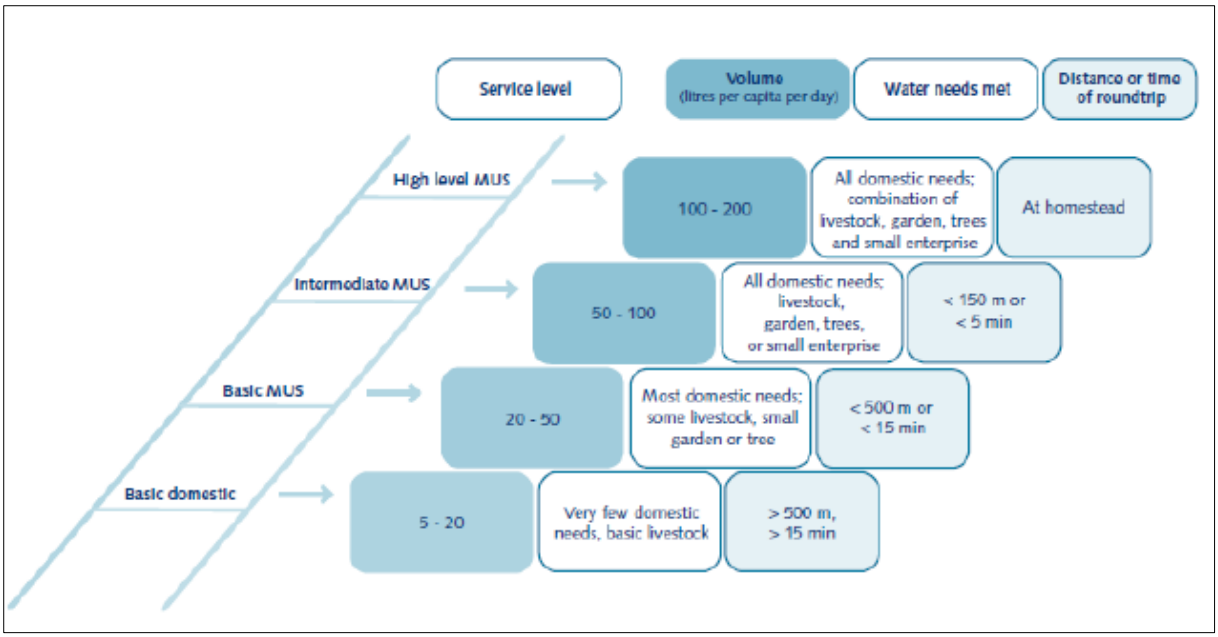

Figure 2: The domestic-plus water ladder (Renwick, 2007; Van Koppen *et al.*, 2009)

At any step on this service ladder, at least 3-5 liters per capita per day should be safe for drinking and cooking. This quantity of safe water is important for domestic water supplies, and for the many situations in which people drink water from other sources. Higher quantities of water of lesser quality for personal hygiene and sanitation are equally important for health (Van der Hoek *et al.* 2002). Scaling up domestic-plus happens mostly via the WASH sector, increasingly in collaboration with local governments.

The **irrigation-plus modality** most frequently applied in India, Vietnam, and China, is the FAO Mapping Systems and Services for Multiple Uses (MASSMUS) methodology for the modernization of large-scale irrigation systems. Relatively small incremental improvements are added on to existing irrigation infrastructure, which mostly improve access to surface water (cattle entry points, washing steps, small diversions for laundry, bridges, roads, etc.). Conjunctive use of seepage for groundwater recharge for irrigation and domestic uses are considered in planning for lining canals or not. In areas where canal water is the main source of water, water is supplied year-round and reservoirs are filled for residential areas. MASSMUS has specific domestic water and gender modules. MASSMUS makes many recommendations that can be applied to small-scale schemes as well, but they have not been systematized into a robust MUS modality as yet.

Other productive-plus modalities

The fisheries sector also conducted research on the better integration of fish and other products into water bodies, e.g. dams or irrigated fields as a 'productive-productive' approach (Nguyen-Khoa *et al.*, 2005). Ancient and modern small village reservoirs have been operated and studied from various productive and domestic entry points, including

irrigation, fisheries, forestry, livestock and domestic uses (Palanisami and Meinzen-Dick, 2001; Venot *et al.*, 2011). Documentation and implementation of these productive-productive and productive-domestic approaches is still fragmentary. With more consolidated effort and coordination they could well crystallize into robust MUS modalities. Scaling up irrigation-plus and other productive-plus modalities is largely through technical line agencies and NGOs. Line agency collaboration with local government tends to be underdeveloped.

1.7.2 User-driven MUS

In the user-driven and community-based modality, water users define the water systems they need for their multiple uses. Government agencies and NGOs avoid setting a priority for any water use, or a specific technology. These approaches are more recent and most are still being piloted.

'**Self-supply for multiple uses**' is the one user-driven MUS modality. Here, users themselves invest in most infrastructure capital costs, often on an individual or household basis, although some communal arrangements may be included. Examples are self-financed wells, pumps, water harvesting techniques, gravity flows, drilling options, and water quality point-of-use treatment devices. Users decide about the purchase, installation and uses, which are often multiple. Scaling up self-supply is largely through market-led supply chains which are often highly effective and sustainable. Public sector support can focus on things like technological innovation, market development for supply chains, credit for purchase, and awareness raising.

The second user-driven MUS modality is '**community-based MUS**'. In this modality, government or NGOs fund the bulk of mainly communal infrastructure construction or rehabilitation costs, but the choice of the technology, siting, and lay-out is in the hands of the community. Community members, including women and marginalized groups, are empowered to articulate their needs and demands, access information, and make choices regarding their assets and resources. This MUS modality applies the general principles of community-based natural resource management to water resources. (Water sub-sectors divides probably contributed to the delay in adopting community-based management compared to land or forestry resources for example). Community-based MUS can be implemented on a project basis or align with the global trend toward decentralization of decision-making of public support through local government, or as a combination of both. An example of the latter is the SADC/Danida supported IWRM Demonstration Projects in five SADC countries (SADC/Danida 2009a and 2009b).

Integration in local government is important because local government agencies are permanent institutions, which not only provide a potential solution for financial and institutional sustainability of communal water systems, but also offer considerable scope for nation-wide scaling. Decentralized decision-making through local government about the

allocation of public resources can lead to community-based MUS without any explicit intention, but as a result of a community's own prioritization for improving the use of multiple sources for multiple uses. This is the case, for example, in India's Mahatma Ghandi National Rural Employment Guarantee Scheme (MG-NREGA), as elaborated in the India country study.

In scaling through local government or through programs interacting more directly with communities, the major challenge is to match bottom-up needs with top-down state and other funds. Institutional support should facilitate participatory planning, ensure inclusion of women and marginalized peoples, and build capacity for making informed choices to articulate long lists of community needs into priority-ranked, time- and budget-bound undertakings, or small 'bankable projects'. These projects are meant to be matched with available top-down financing streams. This can be achieved either by loosening some of the strings on financing and removing or modifying single-use and single-livelihood constraints, or by converging parallel financing streams and pooling them into one project.

In community-based MUS, communities plan and solicit external support based on their overview of all multiple uses and multiple sources for their livelihoods. At this level they can tap efficiencies of developing infrastructure for multiple uses and combining and managing multiple conjunctive sources, which saves funds. Also, communities can negotiate their water needs *vis-à-vis* the needs of other users in the same watershed and at higher levels. Inter-basin transfers may also warrant negotiation. They can formally voice their concerns through local government agencies, up to watershed, district and higher levels as the issue at stake requires, without depending on the top-down establishment of new governance layers like watershed and basin organizations where the more vocal social groups tend to dominate. In this way, community-based MUS is the lowest appropriate level for pro-poor IWRM.

1.8 The practice of change: MUS networking

The 'theory of change' of scaling via one of the four modalities or a combination thereof is one side of the coin. The other side is the 'practice of change'. In the past, MUS innovation and scaling was primarily the result of the effective crafting of networks of MUS proponents from local to global level into communities of practice or learning alliances, primarily through the global MUS Group (see www.musgroup.net). A 'right mix' provides for well-informed and rigorous evidence-based innovation, in which next generic lessons and local specificities are continuously identified. The same network also ensured continuous dissemination and advocacy of this evolving body of knowledge. Such a network also brought the 'right mix of people' together, encompassing water users organizations and professionals from the different sub-sectors; academics, policy makers, and implementers; experts at the lowest local level up to national and global levels; donors and financing agencies and government officials. This scoping study also analyses such past innovation

and networking and recommends partners for future networking to implement the high-potential MUS scaling pathways.

1.9 Methodology in Tanzania

In the MUS scoping study, Tanzania was selected as one of the five countries with a high potential for scaling MUS because it has explicitly been introduced in the country through the iWash project, supported by USAID. Moreover, Tanzania is a focus country of the Alliance for a Green Revolution in Africa (AGRA), an initiative also supported by the Rockefeller Foundation. AGRA focuses on the southern highlands, which receives more attention in this country study as well.

The methodology followed in Tanzania consisted of two field visits in August (by Bernhard Keraita) and November (by Barbara van Koppen) to the iWash project, various rope pump adopters, Sokoine University of Agriculture, and the Mvomero District Local Government Authorities. In Dar-es-Salaam, interviews and group discussions were held with senior professionals of the Ministry of Water, Ministry of Agriculture, Food and Cooperatives, Ministry of Livestock and Fisheries Development, DFID, WaterAid, TAWASANET, and other partners, with Stockholm Environment Institute Tanzania and (briefly) with USAID. The literature and policy documents were also reviewed.

The report is structured as follows. The next section presents the general background on Tanzania, including recent policy trends in decentralization and participation relevant for MUS. Section three gives the background of the country's water resources availability, its widespread forms of traditional and modern integrated water development and management for self-supply, and the general water policy framework with the related single use water departments. The next sections discuss the barriers and potential for scaling MUS according to each of the four modalities outlined above. Thus, section four explores the scope for scaling the domestic-plus modality, followed by a discussion on the same question for the productive-plus MUS modality. Section six focuses on the MUS modality, which includes the iWASH project on self-supply for multiple uses. Community-based MUS with its specific barriers and strong potential for further scaling in Tanzania is discussed next.

Lastly, the combination of Tanzania's potential for scaling community-based MUS and the country's advanced policies on IWRM render Tanzania an important country to explore whether and how community-based MUS can strengthen IWRM as its bottom-up leg. This question is answered in section seven. Conclusions and proposals for networking as the first next step in the practice of innovation and scaling follow in section eight.

2 Tanzania: a background

2.1 Poverty and economy

Tanzania is a resource rich and politically stable country with a growing economy. Overall GDP growth has shown a rising trend of 7 percent since 2005, although the national power crisis and global food and financial crisis contributed to a decline to 6 percent in 2009. Yet, its Human Development Index is one of the lowest, 152 of 187. Relative poverty is only slightly decreasing. Out of the estimated 45 million Tanzanians, 36 percent were poor in 2000/2001 compared to 34 percent in 2007. However, with a national population growth rate of 2.9 percent, the actual number of poor has increased (TASAF 2011). Income poverty varies across geographical areas. Poverty is worse in rural areas where 87 percent of the population lives.

Agriculture accounts for 45 percent of GDP and provides livelihoods for 90 percent of the population, employs 81 percent of the labor force and accounts for 85 percent of total exports. Agricultural growth is slow at about 0.5 percent on average. Livestock is important, in particular nomadic pastoralism practiced by the Maasai in the drier central areas of Tanzania. Manufacturing and industry constitute 25 percent of GDP (year 2000). Economic growth is mainly in mining (14 percent of GDP), construction (8 percent) and tourism (7 percent). The Household Budget Survey 2000/2001 reports inequality in Tanzania is growing as measured by a rise in the Gini co-efficient from 0.34 in 1991/1992 to 0.35 in 2000/2001. This indicates that there is no trickledown effect of economic growth to the expanding rural population.

Agriculture in Tanzania is dominated by smallholder farm households cultivating an average farm size of between 0.9 ha and 3.0 ha each. About 70 percent of Tanzania's crop area is cultivated by hand hoe, 20 percent by ox plough and 10 percent by tractor. Most agriculture is rainfed and vulnerable to seasonal fluctuations, droughts and flooding. Food crop production dominates. Out of the 5.1 million hectares cultivated annually, 85 percent is food crops.

As part of the liberalization policies since the 1990s, government increasingly supports foreign investments. Over 4 million hectares of land have been requested by foreign investors for both agrofuel and food production. By the end of 2010, 70,000 ha of land were formally leased to foreign investors (Oakland Institute 2011).

Figure 3: Map of Tanzania

2.2 Policy framework and decentralization

The national policy framework in Tanzania is the Tanzania Development Vision 2025. This sets the long-term targets of attainment of good and quality life, good governance and rule of law, and a strong and competitive economy to transform Tanzania into a middle-income country by 2025. These goals align with the Millennium Development Goals. The national Strategy for Growth and Reduction of Poverty (or MKUKUTA) translates the Tanzania Development Vision 2025 into medium-term goals for implementation under three major clusters: growth and reduction of income poverty, quality of life and social well-being, and governance and accountability. Foreign aid remains significant in Tanzania. About 25 international development partners focusing on poverty alleviation provide for one third of the national budget.

Administratively, Tanzania's mainland is divided into 21 regions with 21 regional commissioners, 114 districts with 114 district commissioners, and in rural areas 133 local government authorities, which broadly overlap with rural districts. The 133 local

government authorities encompass 2,555 wards and 10,364 villages. On average, one district-level LGA has 20 wards and a ward encompasses four villages.

Decentralization by devolution (dubbed 'D by D') through these administrative structures has been a main objective of government since independence. The socialist government of Julius Nyerere abolished the power of the over 50 traditional chiefdoms to introduce the *ujamaa* philosophy of transferring power to the people. People's powers, economic nationalization and CCM's one-party politics were enshrined in the Arusha Declaration of 1967. The local government authorities of the colonial administration were abolished in 1972 to pave way for the introduction of regional decentralization, from the top down through regional development committees, district development committees and village governments. To enable decentralization by devolution further down, local government authorities were re-established, as enshrined in the constitution of 1977. The Local Government Acts No.7-10 of 1982 stipulate in further detail how local government authorities devolve powers to the community and implement government decisions and service delivery within their jurisdictions. In 1994, the first multi-party elections were held, which maintained a majority for the CCM.

State service delivery with its intrinsic barriers and potential for scaling MUS is now organized as follows. Villages have village councils who elect one village representative for the ward council. The ward council in turn elects their representative for the district council. The district council interacts with the district development committee. The district development committee consists of technical officers from the different line agencies and is chaired by the district executive director, who is appointed by the ministry for local government: the Prime Minister's Office – Regional Administration and Local Government (PMO-RALG).

If resources allow, line agencies also employ technical officers at ward and village level. These technical officers are accountable to the district executive officer. Hence, at district level the district executive officer ultimately decides about allocation of government funding, including water and irrigation projects. He or she is accountable to the zonal or regional superiors of PMO-RALG, and downward to the district council of elected representatives. In this space, service delivery is negotiated and demand-driven integrated needs are to be matched with government's tied and untied funding. The trend is to also better integrate NGOs and foreign aid, including support for water, health and food security, into the government's administrative structures. As elaborated in detail in section seven, since 2001 the 'Opportunities and Obstacles for Development' tool is being developed to guide community-level participatory planning in a holistic manner nation-wide.

Decentralization by devolution of services is accompanied by stronger demands for payment for services. Where free domestic water supply was an important driver for the *ujamaa* policies of village devolution, communities are increasingly supposed to pay for domestic water and irrigation. It is in this institutional set up for public service delivery that replicable MUS models are to be innovated and scaled across Tanzania.

2.3 Water resources in Tanzania

Tanzania is a water rich country with an estimated 2,300 m^3/capita/year, which is significantly above the level of 1,700 m^3/capita/year set by the United Nations as denoting water stress. However, the variation of water availability during the seasons and between different parts of the country is large. About one third of Tanzania, mainly the central and northern parts, receives less than 800 mm of rainfall per annum and these areas are classed as arid or semi arid. Moreover, the dry season there is long, normally extending from June to October, which results in low and seasonal river flows. In contrast, in the southern, western and northern highlands, which receive more than 1,000 mm/year of rainfall, rivers are perennial and flooding occurs.

Tanzania has surface water, inland and bordering freshwater lakes, wetlands and swamps (estimated at over 5 million ha or roughly 6 percent of the total land surface) as well as groundwater. Groundwater is a major source of water for many areas in Tanzania. In the drier regions it is the primary source. The total annual water withdrawal for various socio-economic purposes is only 5.184 km^3 (6 percent of the total internal renewable water resources), indicating a significant potential for sustainable increase in exploitation for the country's social well-being and economic growth. For groundwater, the estimate of replenished withdrawal is 12 percent. Irrigation has the largest overall water resources withdrawals, comprising about 89 percent of the total, with domestic water supply comprising 9 percent and industrial water uses the remaining 2 percent (http://www.tanzania.go.tz/water.html; WSDP Status report 2010). Despite having abundant resources, water is not harnessed, with adverse effects for domestic, industrial, business and agricultural consumers.

The scarcity of electricity is an important economic water scarcity issue. This has propelled the Integrated Water Resources Management debates and subsequent water policies since the early 1990s. The state-run Tanzania Electric Supply Company generates hydro-power in the well-watered Pangani and Rufiji basins, from where it is transported to Dar-es-Salaam, the country's economic hub. Currently, only 14 percent of the people are connected to the grid, while demand grows by 10 to 15 percent annually. A range of feasibility studies since the 1980s identified the Stiegler Gorge, 200 km south west of Dar-es-Salaam in the Rufjii basin, as a site for cheap power generation and flood control. Funding options of private investment, concessional loans and government funds have been explored. Various international partners, including Brazil, have expressed interest. As yet no investments have

been made, though. Reasons for this stagnation include government bureaucracy and foreign environmental protests, because the Gorge lies in the Selous Game Reserve, Africa's largest reserve. As a result of this economic water scarcity, energy shortages and rolling power outages with tangible reduction of the GDP growth rate are frequent.

An important water quality issue in Tanzania is the naturally high fluoride concentrations in the rivers in the fluoride belt of the Rift Valley. There are also local instances of toxic contamination from mining and industrial waste. The quality of groundwater is generally good, but problems of salinity in addition to the high fluoride concentrations are reported. Schistosomiasis and malaria are widespread in Tanzania.

2.4 Self-supply

Most rural Tanzanians depend on informal water self-supply from multiple sources for multiple uses for their diversified livelihoods. Over time, effective local institutions evolved to invest, operate and maintain water infrastructure. Ownership and priority use rights are typically vested in those who make the initial investments and ensure maintenance. Other users can join later if they compensate the initial investors and fulfill maintenance obligations (Sokile 2005; Nkonya 2006; Mehari et al 2009).

Half of the population accesses water for drinking and other uses through wells (Madulu 2002). In the highlands there are abundant springs and streams. Informal communal river diversions, canals and storage (e.g., the night storage tanks or *ndiva*; Box 1) improve access to surface streams, which are also typically used for both domestic and other purposes. For drinking, the quality of these sources has traditionally been safeguarded by constructing the intake of a canal or pipe at springs or upstream of other uses, such as cattle drinking points. For some time, the taste of the water from these streams was preferred over groundwater. Local institutions were not limited to one scheme. Water saving and rotations (*zamu*) were also effectively applied over long distances to manage shared upstream and downstream uses during the dry season.

These informal water uses generate significant livelihood benefits. In the early 19th century there were already irrigators' cooperatives in the mountains around Arusha, which exported coffee. With growing populations and especially growing market opportunities since the 1990s, farmer-managed gravity irrigation has rapidly expanded, but also irrigation with buckets from streams or wells. Drainage water from formal schemes is also increasingly used by people informally settling downstream. These informal irrigators use water efficiently. This was found in a study comparing the water efficiency on fields that were informally irrigated with drainage water and fields of the state scheme of the National Agriculture and Food Corporation (NAFCO) in the upper Ruaha basin. Comparing plots on the NAFCO farm and informal plots downstream, the water efficiency of the NAFCO farms was 35 to 50 percent and between 56 and 69 percent for the informal farmers. The main

Box 1: Ndiva

A small dam constructed on the slope of a mountain; water is either harvested from runoff during rainy storms or diverted from perennial rivers via inlet canals; owned, maintained and used by a group of farmers for domestic uses, livestock and irrigation; owning group solely responsible for all construction and maintenance costs; water use rights decided and supervised by the group as a whole.

A *ndiva* in Same District

reason was that the informal farmers got less water and they used it more efficiently (McCartney *et al*. 2007). Informal peri-urban and urban agriculture is also gaining momentum, either from groundwater and streams or formal water supplies.

Livestock watering has a high priority in rural Tanzania, certainly for the Maasai nomads. Maasai women may wait until the animals have drunk before collecting water for themselves, considering that 'animals need water, but I can drink the milk'. Livestock drink from open sources and also *charcos*, small human-made depressions with low earthen dams to catch runoff and rain (Box 2). *Charcos* are also used for other purposes. Many *charcos* are informal, but government also supports their construction. As many *charcos* run dry in the dry season and as the population and their needs increase, groundwater wells and boreholes become more popular.

Within the last decade, informal self-supply has greatly expanded as a result of the growing availability of cheap 3-5 horsepower pumps imported from Japan, China, Korea and the UK. If placed near homesteads they are used for multiple uses, but in distant fields they usually water crops only. They can also be used to pump water out of *charcos* to animal drinking troughs. Motorized irrigation expands most in areas with growing markets for high-value vegetables. With the prolonged dry spells in Tanzania since 2007, even cereal farmers are now buying pumps (Keraita 2010). As the study by Keraita (2010) further shows, experts from major dealers estimated that the annual number could be 5,000-7,000 pumps. A few mentioned that it could be as high as 10,000 pumps. With an estimated 7,000 pumps yearly for the last 10 years, there may be 70,000 small motorized pumps in Tanzania. Prices vary considerably, from USD120 to USD400. The cheapest from China are not very durable, but farmers seem to prefer those over manual devices such as the treadle pump at USD120. Irrigated farming contributes more than 50 percent of the total household income (Keraita 2010).

Box 2: Charco dams

Ponds dug on relatively flat land and located to harvest runoff; common with farmers and livestock keepers in the semi-arid regions; privately owned; larger *charco* dams constructed for communal use; can serve up to 500 households and more than 4,000 livestock; generally community property or properties of estate farms; village governments form dam management committees.

A *charco* for irrigation and livestock watering in Singida

In Keraita's sample, 76 percent of the irrigators use surface water sources (streams, rivers, irrigation canals) while the rest uses dugouts. In the dry areas around Dodoma, farmers use river flows during the wet season and wells in river beds in the dry season. In Morogoro area, which has multiple sources, farmers use different water sources. The Dodoma area also has the highest proportion of motor pump users (10.3 percent). Ownership of motor pumps in other study locations was about 5 percent. Many farmers occasionally hire pumps. In Dodoma, this proportion is 2 percent, while in Tanga, the proportion is as high as 69 percent. Usually there is a fixed fee for hiring a pump (either per day or area) and hiring farmers are the ones who pay for fuel costs. The proportion of motor pump owners is higher than that of treadle pumps. All other irrigators use buckets.

These examples illustrate the many investments that rural and peri-urban communities make in individual or communal self-supply for multiple uses from multiple sources, and the social and institutional capital that has developed for integrated and livelihood-oriented water management. The question for this MUS scoping study is how public service providers can scale MUS by improving their service delivery to better recognize and leverage these existing water arrangements from multiple sources for multiple uses.

2.5 Tanzania water policy framework and government institutions

2.5.1 Overall policy framework

The integrated nature of community water development and management for self-supply sharply contrasts with the policy framework and institutional set-up for water management. The National Water Policy of 2002 translates the overarching Tanzania Development Vision 2025 and the National Strategy for Growth and Reduction of Poverty (MKUKUTA) for the development and management of the country's water resources. The National Water Policy of 2002 formally adopts an IWRM approach. However, with the exception of a small water resources management component (discussed in section seven), state support for water development and management is according to single-use mandates, programs and funding arrangements, and implemented by single-use ministries, departments, or divisions. These

single-use structures are further entrenched by the ongoing reform in development aid financing. As agreed in the 2006 Paris Declaration on Aid Effectiveness, the development partners in Tanzania have started pooling part of their funding into 'baskets'. The long-term aim is to adopt a sector wide approach to planning (SWAP) and then to change to budget support. These baskets are divided according to single water uses – except for the mentioned water resource management component. For each basket, government and development partners jointly establish a prioritized list of investments. Development partners continue undertaking earmarked projects at decentralized levels, such as the USAID-supported iWash MUS project for self-supply for multiple uses. The Ministry of Minerals and Energy deals with hydropower, including the Stiegler Gorge Dam, which is not elaborated here.

The Ministry of Water has two departments: domestic water supply and water resources management. From 2008 to 2010, the ministry also included a department of irrigation and was the Ministry of Water and Irrigation (MOWI). However, in 2010 the irrigation component moved back to the Ministry of Agriculture, Food and Cooperatives. As one respondent reported, the Department of Agriculture 'felt like an orphan' when irrigation was moved to the Department of Water and Irrigation in 2008. In 2009, a national flagship policy of *Kilimo Kwanza* (agriculture first) was adopted. The budget for agriculture increased by one third so is now approaching 8 percent of national budget.

Tanzania is one of the few countries where water services to livestock are well embedded in government structures. Up until 2003, the Department of Livestock was under the water ministry, which was called the Ministry of Water and Livestock Development. However, in 2003, the livestock department moved to join the new independent Ministry of Livestock and Fisheries Development.

2.5.2 Sectoral policies and decentralization

Each single-use department or division follows a sequence of formulating a policy, legislative framework, strategy and implementation plan that is aligned to the new basket funding. Following up on the integrated National Water Policy 2002, two separate legislative frameworks were promulgated in 2009: the Water Resources Act No. 11 and the Water Services Act No.12. The latter enshrines both ownership transfer and payment of communal water supply schemes in rural areas through Community Owned Water Supply Organizations (COWSOs).

In 2006, a National Water Sector Development Strategy (NWSDS) was adopted, followed by a National Water Sector Strategic Implementation Plan in the same year. In 2007, the National Water Sector Plan 2007-2025 was launched. It is implemented in phases. These plans and phases are regularly reviewed in status reports. Development partners fund 88 percent of the Water Sector Development Plan (NWSDS 2006), primarily from the 'water

funding basket', but also some government funding. The level of funding increased considerably under this new mode of planning and financing. Both the Water Sector Development Strategy and the Plan have four components, again each with their own fund allocation: water resources management, urban water supply and sanitation, rural water supply and sanitation, and institutional strengthening and capacity building. Below we will focus on two components: rural water supply and water resource management.

Similarly, the irrigation sector developed a National Irrigation Master Plan in 2002 as a follow-up to the National Irrigation Development Plan (NIDP) which was launched in 1994. A separate irrigation component is included in the basket funds linked to the Agricultural Sector Development Strategy and Agricultural Sector Development Plan. An Irrigation Policy was adopted in 2010, which is to be followed by a National Irrigation Development Strategy and Legal Framework. It is being discussed whether the division of irrigation, which is now under the Ministry of Agriculture, Food and Cooperatives, should become a national irrigation commission or agency. The latter would be at the same level of ministries and gives more autonomy in fund mobilization and allocation.

Next, within each sector there is the important division of either funding to be spent at national level by line agencies or decentralized to local government. The latter funds pass directly via the Prime Minister's Office Regional Administration and Local Government as conditional capital development or other grants for single water uses, so domestic water development funds or irrigation development funds. The planning and allocation of these local government funds are at district level through the district water development plans and district agricultural development plans.

In the process of decentralization by devolution, local government authorities increasingly implement and facilitate all development activities, service delivery, and rule of law 'to strengthen democracy and speed up community development'. The roles of central government shift accordingly. From direct involvement in production and service delivery, central government departments are now focusing on policy formulation, coordination and advice, and on strengthening capacities of local government authorities, the private sector and NGOs so as 'to create an enabling environment for local government authorities to perform at their discretion'.

NGOs involved in water tend to align with the sectoral set-up for single uses and emphasize decentralization. For example, in the 1980s WaterAid was one of the first NGOs seeking collaboration with local government and its district staff of the line departments of health and community development. Like WaterAid, most other NGOs are also active around the water supply component of the Water Sector Development Plan and Strategy. Policies encourage their involvement in low-income areas to fill service gaps. In addition to the various Dialogue and Thematic Working Groups in Tanzania, 35 NGOs organized into a

network in 2007. This was in response to and as a watchdog for the new Water Sector Development Plan: the Tanzanian Water and Sanitation Network (TAWASANET). Members include WaterAid, Bajara, Southern Highlands IPO, and SNV Netherlands Development Organization. The vision of TAWASANET is 'A Tanzanian society in which all citizens have equal access to safe water and improved sanitation'. The mission is to strengthen the coordination, collaboration and networking of diverse Tanzanian civil society organizations with all other stakeholders to influence policy makers and implementers and to promote good practices in the water and sanitation sector (www.tawasanet). TAWASANET prepared Equity Reports for the Annual Joint Water Sector Review in 2008 and 2009, which also inform this study.

These public sector reforms towards basket funding and decentralization by devolution by both government and water supply NGOs, constitute both new opportunities and new barriers. The reforms end the earlier situation in which many donors implemented parallel projects without coordination and without government sometimes even knowing about them. Basket funding gives more power to the central government to define allocations that align with national goals and national implementation structures. Local government's stronger say in planning can avoid overlap and concentration of funds in one area while other areas are left untouched. Resource allocation becomes more equitable and more in line with locally specific needs that build on local opportunities.

In principle, transparency and accountability to the target group are enhanced, which strengthens ownership and, hence, sustainability of services. In theory, this allows communities to articulate their multiple water needs, opt for cost-effective multi-purpose infrastructure, and build on their capacities to manage multiple conjunctive water resources in an integrated manner. They can prioritize what they see as incremental improvements for external support. In other words, Tanzania's ongoing decentralization by devolution allows 1,000 communities to define 1,000 small bankable multiple use and multiple source projects. However, the barrier which basket funding further entrenches is that the one funding stream from above demands accountability for just one dimension of well being. Spending one funding stream is easier in few larger projects. Even if the one funding stream could be divided over as many as 1,000 water projects, it would still consider just one use.

The following four sections trace how the ongoing implementation of these government water policies and institutions, donor projects, and NGOs can be leveraged to scale each of the four MUS modalities. Lastly, we examine how the water resources management component of the Water Sector Development Plan tallies with Tanzania's shift to decentralization and participation in development and water service delivery, and how MUS would fit as bottom-up IWRM.

3 Potential and barriers for scaling domestic-plus

3.1 Domestic-plus in Tanzania

As defined in the introduction, scaling domestic-plus is increasing service levels, so 'climbing the multiple-use water ladder' by increasing service levels to 50-100 liters per capita per day, while safeguarding drinking water quality for at least 3-5 liters per person per day. In Tanzania, formal service levels are 70 liters/person for consumers with household connections; 25 liters/person for consumers with yard connections; and 25 liters per person per day through water points while also ensuring that any water point is used by a maximum of 250 persons at not more than 400 m or 30 minutes time for a round trip to fetch water (WSDP 2006). The projected population growth that is included in the design norm is 10 percent. It is added that 'the set service levels will, where possible, include adequate water for livestock'. Service levels for cattle are 50-90 liters per head for high grade dairy cattle; 25 for local breeds; 12.5 for donkeys and 5 for sheep. To enable access to non-domestic uses, domestic schemes have add-ons, such as cattle troughs or other separations for animals' access. Dams that are primarily implemented for domestic uses should also have outlets for livestock watering, but this seems less systematically applied than the same type of dams implemented by the productive water sector.

Current coverage is low and trends are unclear. The international Joint Monitoring Programme for water and sanitation found an increase in the rural coverage rate of 39 percent in 1990; 44 percent in 2000, and 46 percent in 2006, while urban coverage decreased from 90 to 81 percent in the same period. Other data suggest a decline in rural areas as well, from 46 percent in 2001 to 40 percent in 2007 (Household Survey 2007). According to these same household survey data, as estimated by the Joint Monitoring Programme (2010), only 24 percent of households use improved sanitation facilities. Other data show lower coverage rates. In urban Dar-es-Salaam, less than a quarter of the over four million residents receive piped water. The rest, in particular low-income residents, rely on informal water vendors. Their prices are entirely market driven, typically higher, and there is no guarantee for adequate water quality.

Actual coverage is also likely to be lower than recorded in rural areas. The investment is counted instead of the functionality and the depreciation of the infrastructure is excluded. Also, water quality is rarely counted. A study by SNV on over 5,000 water points in 10 districts, which showed that 43 percent are not functional, identified causes of non-functionality. Age is an important reason. The large majority of schemes constructed prior to 2005 were dysfunctional. Variation between districts is substantive: in Morogoro District, with its ample alternative water sources, only 17 percent of the water points are functional, but in neighboring Mvomero District the figure is 58 percent.

In interviews with WASH sector professionals on scaling domestic-plus, it was widely acknowledged that domestic schemes are currently already used for non-planned productive uses. The resulting livelihood benefits are recognized, but also the damage when those uses are not planned for, especially in the case of livestock. Peri-urban horticulture is also irrigated with the formal water supply system and other water sources. In Morogoro, even rice is irrigated this way. When formal water supplies are paid for, this is accepted. However, the water supply distribution network in Dar-es-Salaam is too weak to support these uses. Semi-privatization was tried in 2003-2005, but failed. A few years ago, therefore, The Prime Minister publicly called upon the inhabitants not to use water supplies for horticulture. This had little impact, though. Government promotes roof water harvesting and storage tanks in urban areas and public buildings in rural areas.

In the light of these low coverage rates and wide recognition of livelihood benefits but also damage of *de facto* productive uses, the following potential and barriers for scaling domestic-plus emerged from the interviews. Sanitation is discussed under self-supply.

3.2 Scaling potential

The scaling of domestic-plus can leverage the considerable increase in funding for the domestic water component of the Water Sector Development Plan that accompanied the basket funding reform. Indeed, this component has become one of Sub-Saharan Africa's largest water supply programs. This program divides funds equally to urban and rural supplies (while rural areas received only 20 percent before 2007/8). It also allocates half of the budget to local government as earmarked capital development grants, while local government received only 10 percent in 2004. The rest are projects funded centrally by donors and government's own revenues (WaterAid 2006). The plan in 2007 was to install water points in 10 villages in each of the 133 districts.

One potential for scaling is the potential to meet health *and* food security simultaneously. The USAID-supported iWash project discussed under self-supply was the first to formally aim at those multiple benefits. USAID and also NGOs like WaterAid are interested in exploring this option on a wider scale. As food security is an important goal of the Tanzania Development Vision, domestic-plus could well be scaled in Tanzania by raising further awareness in the WASH sector about this potential to achieve higher livelihood benefits.

A perhaps even stronger argument in favor of a domestic-plus approach, which all respondents in the domestic sector unanimously agreed on, was that the income generated would help to pay for operation and setting up a reserve fund for breakdowns. This will mitigate the high levels of water supply scheme underuse, breakdown and abandonment. Domestic-plus is an alternative mode of financing. The user pays principle is increasingly adopted. As stipulated in the Water Services Act of 2009, ownership of communal schemes will be transferred to new Community Owned Water Supply Organizations. They become

formally responsible for operation and maintenance, and for five percent of the capital costs of new schemes.

Income from productive uses is only one factor for scheme sustainability. As TAWASANET (2010) learned from field visits, there are also other factors affecting sustainability of schemes: 'When a water point breaks down, communities do not know what to do or where to seek support and these water points are often subsequently abandoned. In others, people pay expensively and still do not get a proper service as the money collected is often used for other purposes or simply for private gain. None of the villages visited was able to show a rough estimation of O&M costs for their water points and there is no correlation between actual O&M costs and the water tariff. Users keep arguing that it is the government's duty to provide water for free as it was in the past. Politicians often worsen the situation with promises to provide free water for all'. Moreover, there is the general tendency to invest mainly (if not only) in construction of new water points with little attention to rehabilitation or repairing of non-functioning water points (Tawasanet 2010).

Respondents appreciated the study on the multiple-use water ladder by Renwick (2007). They suggested its better dissemination. Moreover, in order to corroborate levels of additional income and food security and incremental investment costs at the different service levels, they suggested calculating the multiple-use water ladder for typical situations in Tanzania. These would include the low-cost piped gravity flow systems in the mountains. These evidence-based calculations would serve as credible advocacy to climb the water ladder. The Stockholm Environment Institute, also based in Tanzania, has already conducted such studies in South Africa and Vietnam, and could assist in a Tanzanian study (Noel *et al.* 2010).

3.3 Barriers to scaling domestic-plus

3.3.1 Targeting for equity

On the negative side, barriers to scaling domestic-plus, some respondents objected to domestic-plus as they feared that the slightly higher costs for higher service levels implies that fewer schemes can be built. This would cause further delays for the unserved and widen inequities. The target of the domestic sector is full coverage, but funds are limited. The aim is rather to serve all with some water than some with all. However, as shown next, unpacking these equity issues highlights that domestic-plus can be the most effective way to reach the poorest and narrow the gap, provided services are well targeted.

As closely monitored by NGOs like WaterAid and TAWASANET, inequities between served and unserved communities and households within that community are deep. A comparative study of 11 districts in 2005 showed that in the seven lowest served districts, access to safe

water supply was below 10 percent, whereas in the four best served districts, access is above 80 percent (Welle 2005).

Inequities are widening. In 1991 differences in access to clean and safe water between the poorest quintile and the wealthiest were relatively small. By 2007, access to improved sources by the poorest was 45 percent, whereas 75 percent of the wealthiest households had such access, especially through household connections. Government performs less well in reaching the lower-half of the less served than do NGOs. For government projects, less than half of those go to the lower-half of the less served. The figure is 75 percent for NGOs. In addition to inequities in access, the poorest households spend 4.5 percent on domestic water supplies whereas the wealthier spend just over 1 percent according to the 2007 Household budget survey. However, in absolute amounts, the wealthier spend about three times as much as the poor.

TAWASANET's Equity Reports for the review of the domestic water component of the Water Sector Development Plan found that inequities were also exacerbated in this program. If allocation had narrowed the service gap, most, if not all 10 projects in each district would have gone to the less-served areas. The opposite was found in an impact study in 28 districts that classified wards in a less-served half and a higher-served half. In only 6 districts did the less-served wards receive slightly more (54-70 percent) of the new schemes. In one district those wards received 83 percent of the new projects. In 16 districts the less-served wards received half or less. In the five most inequitable districts the less-served wards obtained just 10-33 percent. Most new projects went to the already served wards (TAWASANET 2009).

The Equity Report and the department's own status reports shed light on the processes contributing to these inequities. The construction target was set at 10 schemes equitably in all districts, to be funded from the central basket. Central approval was required to procure implementing agencies proposed by the local government authorities. Implementing agencies started their many parallel construction projects, largely accountable to the central level. Villages were chosen by the local government authorities, from the district down, without criteria or procedures to operationalize the stated goal of equitably reaching all. In reality, the selection of villages was influenced by the following factors.

The implementation criteria emphasized the need for self-financing of operation and maintenance costs and 5 percent contribution to the scheme. Therefore, local government authorities tended to select those villages that had a functioning water account. This excluded the unserved without an earlier water point. Further, selection depended on the dynamism, visibility and connectedness of the ward councilors. This excluded the more remote villagers with less vocal councilors. As this was a once-off program, the risk is that

each new program repeats the same mistakes. Without some measure to redress earlier exclusion, villages that were excluded in the past are likely to be excluded again. Villagers themselves remained unaware of any selection process and eligibility criteria or even the program, until they had been selected. Although the burden of fetching water falls on women and children, men took the decisions at village meetings. For men, investments in water point development or rehabilitation are not a priority. The rule that committees should have 4 or 5 women and 4 men failed to be implemented (TAWASANET 2009). Although it was envisaged to apply the national Opportunities and Obstacles to Development tool, the once-off process was so top-down that its application was impossible.

In this specific program, the concentration of benefits among the few, mainly consultants, went even further. The Implementing Agencies prepared tender documents 'that in some cases exceeded many times the funds allocated to them' (WSDP 2010). In the name of 'participation' villagers were given some choice in the selection of the technology. Without obligations or ceilings attached they opted for more expensive schemes – with the highest rewards for the implementing consultants as well. Electric pumps were selected where possible. Those higher demands required a larger share of the pie, with the result that sometimes just 1, or 3 or 4, or a maximum 5 of the 10 villages got a scheme. For the estimated one million people reached, costs were estimated at USD300 per person – considerably more expensive than the most expensive urban supplies. Commenting on these experiences with consultants, government officials preferred the costs of technical backstopping to be some 5-10 percent of total costs. Therefore, they found that in-house skills and peer-supervision need to be mobilized again.

TAWASANET suggested various ways to better target the unserved. These principles of targeting marginalized groups are the same as for the Opportunities and Obstacles to Development tool and irrigation and community-based MUS. They include:

- Select villages based on needs as defined by public transparent criteria such as certain proportions of unserved wards.
- Target and build the capacity of genuine representatives of all villagers, especially women, based on quotas.
- Engage in a participatory planning process for project formulation, including women and other marginalized groups according to transparent criteria, within a clear budget and time frame, and informed technology choice by people instead of imposing externally designed schemes.
- Have a longer-term process so requests that are not awarded a first time can be awarded later.

Targeting the unserved in this way effectively bridges the gaps between those who already have higher service levels. This can well go together with the higher service levels of the domestic-plus approach. Even stronger, higher service levels are especially important for women and the poor. Women often have a stronger say over production at and around homesteads than over production at their male kin's distant fields. For the landless, the homestead is the only site where they can use water productively. It is noted the solution of better targeting domestic-plus services to the unserved can already work if there is no additional funding in the WASH sector's purse. Less subsidies to the 'haves' would be another way to keep more funding for targeted services. Moreover, at the central level, funding for domestic water services, irrigation and cattle could be pooled. The same overall level of funding would allow more cost-effective schemes and generate more livelihood benefits. Better performance in poverty alleviation could encourage government and development partners to allocate more funding overall. The only policy change that is required at central level is a widening of the mandate from single use domestic to multiple uses. Policy makers could decide to maintain a priority for water supplies near to or at homesteads. Significantly, accountability would be measured in terms of improvements in more dimensions of well being in each scheme, and also in terms of accountable and transparent targeting procedures.

Apart from the equity and targeting issues, there are two more lessons from the rural water supply component of the Water Sector Development Plan. First, TAWASANET and the government's Review Report conclude with the need for better ways to provide competitive, affordable and value-for-money advisory services. This can be through the private sector and through peer review among government officers; and through local government and line agencies, whatever combinations work best. We will come back on the synergy that a multiple use perspective gives: instead of having two different engineers, one for water supply and one for irrigation, one cross-sectoral engineer can support multi-purpose infrastructure.

The second lesson is also about district level support. Planning and documentation is now according to the many parallel programs, and often only memorized in officials' minds. Even the issuing of Registration Certificates for the newly established Community Owned Water Supply Organizations can be delayed for years, while the formal term is 30 days. A minimum improvement is to compile consolidated lists of water supply projects, for example on excel. Productive water projects should be added in this system. A second improvement would be water point mapping. WaterAid introduced this tool and tested it in 55 districts in collaboration with AMREF and SNV Netherlands. This tool visualizes information on the distribution and functionality of water supply infrastructure across wards and districts. Data are entered into a GIS database and correlated with official demographic, administrative and physical data (population density, administrative boundaries, roads, etc.). The

information can be displayed via digital maps so inequities can be easily spotted and redress considered in new resource allocation. WaterAid recognizes that it is a time and resource consuming task to develop such water point maps in the other districts of Tanzania. A major challenge is to keep the maps updated. By adding all water sources and technologies to these maps, cost-effective synergies can be achieved. Yet, all this would fully align with Tanzania's Opportunities and Obstacles to Development tool. These synergies are elaborated later.

3.3.2 Water quality

A second objection to scaling domestic-plus is that it is a waste of money when treated water is used for purposes that can do with a lower quality. A better look at this argument shows that this objection does not hold in most situations. If water is paid for, as in urban utilities, the choice whether or not to use expensive water for certain purposes is left to the user – at least if the water supply distribution network can manage the quantities. In most rural schemes beyond the areas of geological fluoride concentration, treatment is not needed or it is needed but not applied anyhow. For groundwater schemes, water quality is already good. For schemes from mountain springs and streams without treatment, quality is sometimes acceptable.

For rural schemes with central treatment, the aim of high quality water may still not be achieved, because contamination occurs between the water point and its use. Point-of-use treatment of just the quantities needed for drinking is emerging as an alternative solution within the WASH sector. Locally, people boil water, or they use sand and stone filters, but this is rarely practiced. There were cases in which people thought they get sick from bottled water, or that surface water is healthy and has a better taste. New forms of point-of-use treatment are currently introduced in Tanzania by the iWash project (see section on self-supply). This solution not only ensures safe drinking water but also accommodates the reality that many other domestic water uses, for example water for personal hygiene, do not require a high water quality either.

Another counterargument to this barrier concerns the trade-offs of the exclusive promotion of the goal of high quality drinking water. As researchers found, the domestic sector's emphasis is very strongly on 'the drop to drink' but not on 'the bucket to bathe' (Madulu 2002), let alone the 'flow to grow'. Cases are reported in which new domestic schemes which require payment are abandoned because people return to their traditional sources, which are for free. This is also a waste of public resources. Areas with multiple sources are seen as 'difficult areas' by e.g., WaterAid. Yet, from a broader livelihood perspective such multiple sources are opportunities to bring more benefits at lower labor costs for resilient livelihoods, including more 'buckets to bathe'.

3.3.3 Priority for domestic uses

A third barrier to scaling domestic-plus is the fear that allowing productive uses jeopardizes the priority for domestic water uses in terms of water quantity. This is especially an issue for communal schemes that are under-designed to meet just minimum service levels for all. In this way equity is assumed to be hardwired. The fear is then that those who use water for productive uses will deprive others from even just meeting their minimum domestic needs. So productive users would 'steal' water designed for domestic uses. Moreover, the better off often have both more social power and more means, such as land or other inputs, to use more water productively. So allowing for multiple uses would exacerbate social inequities. This is also an important concern in the light of the Water Resources Management Act, which prioritizes domestic uses.

Productive uses at homesteads are rare if a round trip to fetch water takes more than about five minutes, as research found. For all water points that have sufficient water, the issue is to reduce labor by introducing donkeys or carts, as WaterAid suggests. If connections are closer to homes, such non-planned productive uses are more likely. Service providers are well aware it is often ineffective to just forbid productive uses of a 'domestic' scheme. Technically, service providers can ensure that sites are well selected. Hardwiring may also work in some conditions. For example, reducing pipe diameters for upstream users may help in avoiding their overuse. However, for the rest, designing for limited water availability ('scarcity by design') mainly intensifies competition and conflicts among users at the expense of the poor.

Prioritization during the dry season mainly depends on local norms. Little is known on how communities set their priorities between the different uses from the different sources, as most research is also single-use and often single-source focused. However, it is clear that social and gender hierarchies tend to be reflected in water allocation. Therefore, the public sector contributes to prioritizing domestic uses by equally including women and the poor in the participatory planning process and providing technology choice. Options could include technologies for individual households or smaller groups because upstream-downstream conflicts are less likely. Better siting and setting realistic rules that anticipate multiple uses, and tariff setting with the lowest fees or full subsidies for domestic uses also mitigate inequitable uses.

Lastly, a priority for domestic uses for all is not necessarily equitable. Urban middle-class and other municipal users tend to claim this priority but they deprive peasants who use smaller quantities of water for basic food security and income needs. As elaborated in the next sections, a people-centered approach across the water sector that recognizes people's multiple basic water needs is more fruitful.

3.4 Conclusions

There is a significant potential for scaling domestic-plus in Tanzania's large WASH sector. Domestic-plus is especially expected to contribute to achieving the sector's current mandate because of the higher ability to pay as a result of income generation. This is important in the light of the government's new emphasis on 'the user pays'. A first step for scaling is further awareness-raising of the multiple livelihood benefits that can be achieved with small incremental investments. Evidence for this can be generated by initiating an economic analysis of the multiple-use water ladder for the Tanzanian context.

A next step is that government and NGOs start implementing replicable domestic-plus pilot projects. Generic issues to address in such pilots include the expansion of the single-use mandates and budget strings of government and development partners. Current basket funding needs to allow for multiple uses. This enables wards and district governments to better match bottom-up integrated demands with top-down financing streams.

In piloting and scaling domestic-plus, equitable allocation of public funding requires attention in order to avoid that the extra costs of providing for higher service levels even further increase the gaps between the served and unserved. So accountability of public spending should not only be measured in terms of numbers of people and their multiple uses, but also procedures and targeting to better reach the unserved.

Pilot projects should also trace how water quality issues can be addressed more realistically by considering alternative water sources, alternative point-of-use treatment and anticipating people's preferences.

For two other important issues for further piloting and scaling there are important synergies with the other MUS modalities. This is the issue of water allocation within communities and district-level provision of technical expertise and planning administration and tools such as water point mapping. These issues return below.

4 Potential and Barriers for Scaling Irrigation-plus

4.1 Productive-plus in Tanzania

In discussions on scaling irrigation-plus, the engineers referred to themselves as 'livelihood engineers', well realizing that irrigation schemes provide many more livelihood benefits than irrigated crops alone. Many examples were cited and found in the literature of 'implementing marginal practices on the ground to accommodate multiple uses'; 'accommodating *de facto* multiple uses at management level', and 'fully integrating multiple uses from multiple sources in planning, design and use'. These are the last three steps in professionals' changing attitudes from single-use towards MUS that were mentioned in the introduction. An example of people informally settling downstream of irrigation schemes to use drainage water in the upper Ruaha Basin was mentioned above. Here, the official allocation schedules fully included their water needs. Storage dams are invariably for multiple uses, in most cases by design. Separate outlets are constructed for domestic uses while other outlets are for livestock and have troughs. In irrigation schemes, separate canals or the tail end of canals are also designated for livestock. Such uses are negligible in quantitative terms; the issue is constructing add-ons to improve access. Instead of seeing human and animal water consumption as 'stealing', such uses are recognized as important. The damage by livestock to crops and infrastructure if their water uses are ignored is well known. Fines for livestock owners who enter irrigation schemes are common, but implementation of fines or other arrangements to inhibit livestock's entrance are often ineffective.

People also drink water of the irrigation scheme. This is a better alternative than no water at all or at too high labor costs. Point-of-use treatment has not been considered as yet for these unimproved sources; colleagues from the domestic sector are seen as responsible for domestic schemes. In the water abundant irrigation schemes it is not an issue whether or not to prioritize domestic uses. But domestic uses are prioritized at higher aggregate levels. A case was mentioned in which a new irrigation scheme upstream appeared to deprive downstream users so much that they could not even meet their domestic needs. The officials of the ministry of irrigation themselves instructed their colleagues to destroy the upstream irrigation scheme. Irrigation professionals interviewed also mentioned the need for good drainage to avoid the breeding of malaria mosquitoes. Yet, enabling access for these multiple uses and livelihood benefits is done 'on the way'; the priority remains for irrigated cropping. This approach is what we define as an 'irrigation-plus approach'.

Another productive-plus modality that is well-articulated in Tanzania regards livestock watering, not only as part of the irrigation-plus modality, but also otherwise. The livestock water services unit, which is now with the Ministry of Livestock and Fisheries Development in the section 'land for livestock development', has issued design manuals (MOWI 1997).

The water services unit supports other departments and districts in setting and communicating design standards for livestock and provides backstopping.

A total of 1,200 *charcos* have been constructed (Box 2). As more than half dry up in dry season, the emphasis shifts to groundwater systems. In all designs, other uses are incorporated, including technical devices to ensure that water for livestock remains a priority. Currently, national maps only show irrigation schemes, but maps for *charcos* are lacking. Further mainstreaming of livestock watering needs would be enabled by establishing such maps. Perhaps better is to compile maps that show rivers, wetlands, lakes, dams, irrigation schemes, water points, and *charcos* all at the same time. This is suggested in the Opportunities and Obstacles to Development tool.

4.2 Scaling potential

4.2.1 Consolidation at scale

As irrigation-plus is already practiced in many ways, a first step in scaling irrigation-plus can be a further systematization of designs and use of add-on devices, a more explicit articulation of all uses in policies, and some form of valuation of the additional uses and livelihood benefits. The FAO MASSMUS methodology for large-scale irrigated areas can guide such effort to make irrigation-plus a more robust MUS modality in Tanzania.

The potential for applying such consolidated irrigation-plus at scale is strong, because extensive expansion is taking place under the agricultural sector basket funding. Tanzania has about 44 million hectares of land suitable for agriculture, out of which only 23 percent (10.2 million hectares) are used. Out of 29.4 million hectares of land suitable for irrigation, only 330,490 hectares (1 percent) was under formal irrigation by 2009/2010. The most dominant irrigated crop is rice. Other crops are sugarcane, tea, coffee, vegetables, orchards and other trees, and flowers. The goal of the National Irrigation Development Strategy (NIDS) 2010-2025, which implements the National Irrigation Policy of 2010, is to develop 450,000 hectares, so 30,000 hectares per annum. Crops will be further diversified. This strategy will be operationalized into an Irrigation Sector Development Program (ISDP) and National Irrigation Development Strategic Implementation Plan, as a component within the agricultural sector basket funding.

Currently, 60 percent of the irrigation funds come from the irrigation component under the Agricultural Sector Development Program (ASDP) of 2006. Unlike the various national level projects under the Water Sector Development Program, most ASDP funding goes straight to local government authorities via PMO-RALG as the District Agricultural Development Grant (DADG). Accountability is institutionalized in the conditions under which funding is provided. For example, when minimum conditions are met and performance improves, funds increase.

Within the ASDP basket funding, there are two funds for irrigation: the National Irrigation Development Fund (NIDF) and the District Irrigation Development Fund (DIDF). They are earmarked for financing irrigation intervention at the National level and local level respectively. Moreover, additional funding is available for public investments of large-scale irrigation schemes, such as inter-district irrigation schemes and complex irrigation infrastructure. Besides the ASDP, irrigation infrastructure investments can also be paid from local government capital development grants, which are partly sector-tied and partly discretionary. Earmarked top-ups can be made for more expensive irrigation investments. This flexibility allows local government authorities to adjust to local needs and to pool resources. However, the earmark remains for a single use: 'hectares of irrigation'. Different types of irrigation continue to be supported according to the 2010 Irrigation Policy, most of which include non-irrigation purposes as well.

Box 3: Tanks

Provide water for multiple uses, affordable, easy to use; can be designed to suit different conditions; structure is family owned, maintenance usually good; elevated tanks provide the pressure for drip irrigation.

One type that is supported is traditional and modern small-scale self-supply. This is in situ rain water harvesting in bunded fields and harvesting of run-offs from seasonal streams in the arid and semi-arid areas of central part of Tanzania (Box 3). Traditional gravity schemes in the highlands also continue receiving support, for example to make intakes more durable or to line canals. Appropriate technologies such as drip irrigation and treadle pumps are promoted. However, there is little attention as yet to individual motorized pumps. Some projects focus on self-supply irrigation with untreated wastewater in urban and peri-urban agriculture.

Another form or irrigation are small, medium and large smallholder schemes. There are currently 2,000 schemes in the country. Surface storage facilities are usually developed for irrigation and other uses. The emphasis of new construction is shifting to groundwater development. In addition to this new construction or rehabilitation support to smallholders, the irrigation policy promotes existing and new commercial schemes that are privately owned by large-scale farmers, also from abroad. Some former smallholder schemes that performed poorly are being privatized. Out-growers models will be established where appropriate.

4.2.2 Decentralized participatory planning for sustainability

The sustainability of irrigation interventions has been weak. Underuse, low productivity, neglect and abandonment are reported. Improving general sustainability is an obvious condition for scaling irrigation-plus as well. Where the domestic sector expects better sustainability from income generated from productive uses under domestic-plus, the irrigation sector has always generated income, but still faces similar problems as in the domestic sector. The irrigation sector expects most from more participatory approaches. This is well articulated in the irrigation policy. This is in line with the reforms towards liberalization and private sector involvement, in which the role of government itself changes. In the past, government and development partners used to do the inception, design, and construction of schemes, after which smallholders were supposed to take over. Development of irrigation scheme infrastructure is now seen as a responsibility of the private sector as investors, service providers or as partners through public private partnerships. In this trend, farmers initiate irrigation development projects and contribute to the capital investment. This creates a sense of ownership for longer-term sustainability. Further, in line with the decentralization policies, implementation is through local government authorities.

Participation is guided by the national Opportunities and Obstacles to Development tool (see below). Farmers are encouraged to have a stronger say in fund allocation. Organizations of farmers and nomads contribute to district planning, as supported, for example, by IFAD. In order to match communities' needs with funding streams at district level, various arrangements exist. They allow for 'thinking widely', as a district official mentioned, and for pooling complementary funding sources. He mentioned examples in which local government authorities complemented funding for the irrigation scheme with roads and bridges to reach the scheme and transport produce. The authors are not aware that these irrigation funds have been pooled with water sector development program funds, but, in principle, this seems possible.

This flexibility in funding and pooling is important. Participatory, bottom-up planning is likely to identify a wider range of water needs than the sector's mandate. Moreover, opportunities for multi-purpose infrastructure can be tapped. In irrigation-plus approaches, fields and crops will remain the implicit priority and entry point. When storage, canals, pipes and fields overlap with residential areas and homesteads, sectoral boundaries are bound to get blurred. Genuine participatory planning and design of irrigation-plus for new construction or rehabilitation automatically becomes community-based MUS. If villagers prefer irrigating their homesteads instead of distant fields, which may well be the preference of the land-poor, disabled and women, irrigation-plus becomes domestic-plus.

A major bottleneck in participatory planning is local government authorities' capacity. With the decentralization reforms, local government authorities have become responsible for

implementing irrigation interventions. This includes identification, planning, designing, construction and management of irrigation schemes. Most local government authorities lack adequate capacity to undertake such irrigation interventions. The irrigation policy, therefore, seeks to provide support.

Institutional support includes conducting awareness creation meetings on roles and responsibilities including ownership, management, acquisition of water use permits, paying water user fees, operation and maintenance charges on irrigation schemes. Also, irrigator organizations falling under this ministry are to be registered as irrigator associations or irrigators cooperative societies depending on the decision of the irrigators. By 2010, only 210 of the 2,000 were registered. Further, comprehensive guidelines for irrigation scheme development have been developed under the District Agricultural Development Plan in collaboration with the Japan International Cooperation Agency.

Technical advice, capacity building and backstopping is also envisaged. Technical backstopping is provided by the country's seven zonal irrigation units. Within the local government authorities at district level, the planning officer and community development officers take the responsibility. Currently, there is a district subject matter specialist on irrigation, but this officer is lowest in the hierarchy: this specialist reports to district extension officer, who reports to the district agriculture and livestock development officer, who eventually reports to the district executive officer. It is proposed to introduce district-level irrigation departments headed by an irrigation engineer.

In our interviews in Mvomero District with the water engineer (under the Ministry of Water) and the district agricultural and livestock development officer (under the Ministry of Agriculture, Food and Cooperatives), it appeared that the water engineer was the only engineer at that moment, so he also looked after irrigation schemes. They met as a water committee, chaired by the district executive officer, with the engineer as secretary, and with members from the planning office, health office, and community development. Our respondents thought that multiple-use planning and design would well be possible: 'we have to sit together', for example by also inviting the agricultural and livestock development officer to this water committee.

The engineers' focus on the single use of their line agency's superiors is probably more the result of sectoral structuring than of intrinsic differences in technical designs. Obviously, the volumes for productive uses are larger and timing is different than for year-round domestic uses. Yet, there are commonalities in the basic expertise of civil engineering. Standing in for each other, as in Mvomero, saves costs. An option for further consideration is to render more engineers 'health and livelihood engineers' for multi-purpose infrastructure, rather than duplicating such scarce skills. The group of senior engineering staff of the domestic,

livestock and irrigation sectors could examine this option in further depth. Joint education, frequent interactions, and their temporary inclusion in the same ministry provide the strong basis for such judgment. Their vision on capacity building of junior colleagues is also vital. One senior engineer said: 'The only thing still missing for facilitating more exchange across the sectors is for someone to start connecting'.

4.3 Barriers to scaling irrigation-plus: equity and priority allocation

Participation is likely to identify multiple water needs and to improve sustainability of interventions. However, participation is not necessarily equitable. Widening inequities would be a barrier to scaling pro-poor irrigation-plus. Unlike the domestic sector, the irrigation sector has no ambition to reach 100 percent coverage for those who want to irrigate, or to narrow inequities in access to public irrigation infrastructure. Targeting is implicit by targeting smallholders' traditional infrastructure and by allocating irrigated land to smallholders in new schemes. From the type of irrigation supported, it can be deduced that smallholders are effectively being reached. However, there is no monitoring system to systematically translate hectares to numbers of benefiting farm households. Under growing privatization and demands for farmers' contributions, it is more likely that inequities will exacerbate. As we saw above for the domestic sector, the requirement for own contributions implicitly favor the served or progressive farmers, at the expensive of the less- or unserved.

This risk of growing inequities has received attention, both around the ongoing 'land grabs' and the flagship policy of *Kilimo Kwanza* (agriculture first). *Kilimo Kwanza* seeks to modernize agriculture for higher productivity and to attract private investors to finance agricultural development. Among others, banks are encouraged to start lending to the agricultural sector. A national technical input voucher system aims at promoting input provision. VAT exemptions and other taxation reforms seek to reduce the costs of doing business and to increase farmers' incomes. Private land titling is supported through village level procedures to process title deeds according to the Land Act of 1999. This is still largely done by hand so computerization of databases is envisaged. The criticism is that *Kilimo Kwanza* was dominated by the Tanzania Business Council without consultation with small producers. Also, the amounts of loans provided by Tanzania Investment Bank are too high for smallholders. The prediction is that modernization and commercialization with capital intensive mechanization will outcompete the millions of peasants who have nowhere to move. They can hardly be absorbed into the secondary sector, as peasants in industrialized countries have done in the past. Smallholder market outlets will be blocked forever, even before land and water resources become too scarce and lead to intense competition.

The short-term competition will be less for water resources per se. Rapid large-scale infrastructure development on the more advantageous sites will render infrastructure development on other sites more expensive. For land, respondents mentioned cases in

which villagers suddenly realized that part of what they considered their land, had been sold.

In sum, equity considerations are only raised in the domestic sector. For other water uses, the trend is that inequities widen. This barrier to pro-poor MUS can be overcome by a holistic, cross-sectoral perspective on equity in access to water. In this perspective, all citizens are considered equally in targeting public support to everyone interested in taking up water for domestic and productive uses. Similarly, water allocation priorities consider all water uses and water users. It would be a top priority to provide water where it helps meet basic health, food security and income needs. The Tanzanian government already sees domestic needs as a human right. The water law 'respects and protects' domestic uses as the priority water allocation. The government also 'fulfills this right by delivering the service.

The human right to water for domestic uses can be expanded to water uses that meet the socio-economic human rights of food security and income. One straightforward aspect of such broader rights to water is that government should respect and protect such uses wherever citizens already make investments to access water themselves. This implies that the legal priority for 'basic human needs' is not implicitly confined anymore to domestic water use, but to all water uses that meet socio economic human rights. All such uses should receive priority in the country's water allocations. This is further discussed below under water permits. A more complex issue on the human rights to water for productive uses regards what WaterAid called the 'right to services'. This is the state's obligation to fulfill water such rights by investing in the infrastructure to deliver the services. One perspective is that water uses around homesteads that are captured under the domestic-plus modality of higher service levels, should be included as universal basic human socio-economic rights that the state should commit to fulfill. But other productive water uses are much more diverse. The cost-benefit ratio of infrastructure for small-scale productive uses and the price at which this is delivered will also greatly vary. It may be unrealistic for the state to commit to fulfill service delivery in such cases. Calling upon the human right to participation may be more appropriate to accommodate the diversity in productive uses. Holistic participatory planning and design that targets the unserved accommodates this local diversity. In any case, government can support these processes if they widen up the single use earmarks and also vest accountability in targeting the poor with transparent criteria and procedures.

4.4 Conclusion scaling irrigation-plus

The potential for scaling irrigation-plus is significant. The 'livelihood engineers' of the irrigation and livestock units in the respective ministries already enable multiple uses of irrigation infrastructure for livestock watering and domestic and other uses. As agriculture and irrigation are high priorities for the Tanzanian government, the potential for further

scaling is substantive. The planning, design and implementation of irrigation interventions through local government authorities becomes more participatory according to the Opportunities and Obstacles to Development tool. This will improve sustainability. Moreover, villagers will raise multiple water needs and can request more cost-effective multiple-use infrastructure. Boundaries between irrigation-plus, community-based MUS and even domestic-plus will further blur. Funding is mostly through the irrigation component within the agricultural sector development plan basket. However, at district level there are already opportunities to 'think widely' and combine funding from different sources in meaningful integrated projects. In sum, irrigation-plus 'hits the ground running' in further scaling.

The first proposed step for further scaling is to systematize and formalize these practices into formal designs, policies, and further valuation of non-irrigation uses. FAO's MASSMUS methodology can be used as a guide for this. The role of point-of-use treatment for domestic uses from unsafe surface water could be explored.

The second step for scaling irrigation-plus regards support to local government for service delivery and equity issues. Both aspects have strong synergies with the WASH sector. As we have seen for the WASH sector, a major bottleneck for irrigation development and rehabilitation is the lack of technical capacity of local government authorities. Sectoral structuring of district, ward, and village expertise requires staff for each sector. However, when civil engineering expertise is a common basis, district level technical staff can serve different sectors. It is proposed to encourage further connections among the senior engineers of the respective line ministries to address current and future technical capacity building from a multiple use and multiple source perspective. This includes widening up the single-use basket funding earmarks.

The other field where integration with the WASH sector would be fruitful is equity. In contrast to the domestic sector, the irrigation sector pays little explicit attention to equity, let alone 100 percent coverage. In the past, interventions tended to target smallholder irrigation. However, the recent trend is to mobilize more private investments, also by foreign large-scale investors. This is likely to self-select the 'haves' and to widen inequities. A more holistic, cross-sectoral view on equity in water for any use could fill the emerging void at the bottom of the pyramid. All water uses that meet basic human rights to domestic water, food security, and income could be supported and prioritized in the Water Resources Act. Moreover, as in the domestic sector, accountability should go beyond the single use (hectares of crops) only. It should also be measured in terms of non-irrigation uses and targeted and transparent planning procedures for equity.

In the +plus approaches, the bulk of investments in infrastructure remains with the public sector. Higher user payments and participatory design are to mitigate the disappointing results of public communal schemes in the past. The next section discusses the other solution: promoting technologies that even poor water users can buy themselves and use as they like, which is often for multiple uses. Even though this approach perfectly aligns with government's aim of mobilizing private investments *and* poverty alleviation, government is still less involved; NGOs and development partners are the driving force, also in introducing MUS.

5 Potential and barriers for scaling self-supply for multiple uses

5.1 Self-supply for MUS: iWASH

The USAID-supported Integrated Water Sanitation and Hygiene (iWash) project introduced the notion of MUS in Tanzania to generate the mutually reinforcing benefits of health and food security as part of integrated water resources management. The project is part of the Global Water for Sustainability (GLOWS) program (www.globalwaters.net). This program aims at increasing social, economic, and environmental benefits to people of the developing world. It recognizes the need to improve immediate access for human populations to critical services without compromising the integrity of water sources and the aquatic ecosystems upon which human populations depend. The GLOWS Consortium is led by Florida International University and includes CARE, WaterAid America, Winrock International, World Vision, and the World Wildlife Fund (WWF). We focus here on the Tanzanian project, based in Morogoro and working in the Wami-Ruvu basin, in particular on the component led by Winrock International on water supply for multiple uses and private sector development.

Box 4: Sign Board on multiple use rope pumps

This signboard is promoting pumps made by Robin Msuya, an artisan trained by Winrock-SHIPO in Madizini.

Photo: Ben Keraita

Although still young, iWASH has supported the introduction of a wide range of low-cost smart technologies. In collaboration with other partners, iWASH set up a vibrant circle of private sector manufacturers. Technologies include the rope and washer pump, rota sludge drilling, groundwater/tube recharge, drip irrigation, latrine slabs, small water tanks, and also the tulip filter for point of use treatment (Boxes 4-5). An important partner is the Southern Highlands Participatory Organization (SHIPO), based in Njombe, and Connect International. For pump production, drilling and installation, local entrepreneurs were trained during six years. They now form a private supply chain. Only quality control is still being done by SHIPO. Technical training is also provided elsewhere in Tanzania and in seven other African countries.

In this way, through SHIPO alone, 626 partially sponsored rope pumps were installed by village action groups consisting of about 15 households. These are primarily used for domestic purposes. In addition, 535 pumps were sold privately, especially in Njombe town. Eighty-nine percent of the owners use them for domestic and productive uses (e.g., irrigation, cattle, small fish tanks and washing cars). A sustainability study of 5,085 water points mapped in Iringa shows that the rope pumps are third in sustainable functionality, after Nira hand pumps and gravity standpipes, but before the India Mark II and the SWN80 and Afridev hand pumps and submersible electric pumps. Moreover, costs are among the lowest (see table 2).

Table 2: Costs of a rope pump (material, transport, training) by distance to manufacturer

Distance from town	10 km	80 km
Pump only (not installed)	USD 97	USD 97
Pump installed on existing well	USD 337	USD 380
New well with pump	USD 423	USD 560
New borehole with pump	USD 627	USD 793

Source: PowerPoint presentation Dinie Nijssen - SHIPO

Box 5: Rope pump

Rope pumps are manual pumps with high water discharge for multiple uses; low cost; rubber washers lift water from some 40 meters; can be placed on well or borehole.

iWash also collaborates with four other manufacturers, Sema Singida, Maji safi afya Bora Ifakara Morogoro, Desk and Chairs Mwanza, and IYDC Iringa. Their sales amount to another 1,000. With the recent recruitment of an agronomist, iWash is broadening its support to water-dependent livelihood activities.

Another technology that is taking off, also through iWash, is point-of-use treatment. Since 2008, SHIPO has sold 5,678 tulip filters, also to other NGOs. Further monitoring of their adoption and impact both in areas where people have access to improved water sources and in areas without such access, would generate new insights in the potential of point-of-use treatment as complementary safeguard of water quality.

Besides developing low cost technologies and setting up a sustainable supply chain of manufacturers and retailers, iWASH/Winrock closely collaborates with government to create an enabling policy environment for self-supply for multiple uses, in

particular with Mvomero district local government authorities. Community mobilizers assist in mobilization, for example for labor contributions to dig trenches. Initially, a local politician resisted the installation of rope pumps, calling this a 'dinosaur-era' technology. However, after some years, Winrock continued working in this village and changed the image of rope pumps.

5.2 Other self-supply for multiple uses

Other NGOs have also introduced low-cost technologies for which market-led self-supply chains are being set up. Since 2001 the NGO Kickstart International has introduced treadle pumps, in particular the Super Money Maker. With its higher discharge the pump is mostly used for irrigating, but is also used for other purposes (box 6).

Box 6: Treadle pump

Treadle pumps such as the Super Money Maker are used for irrigation, but also for other purposes such as for water sale. Their total pumping head is 14 metres. Cost of pump and accessories is USD 135.

Photo: Barbara van Koppen

By mid-2009, a total of 38,500 pumps were sold in Tanzania. Out of these, 89 percent are Money Maker pumps, with the rest being hip pumps. The NGO World Vision International is an important client. A private company, Balton Tanzania Ltd with an office in Arusha imports, promotes, sells, and distributes the pumps. Marketing is done through agricultural shows, TV, radio, and newspapers. Concrete Peddle (PeP) pumps are promoted by the NGO Water for Third World Countries (W-3-W).

However, motorized pumps are increasingly preferred. Their price decreases over the years while the treadle pumps have remained more or less the same price. The competition will further increase. The rope pump, which is cheaper than the treadle pump, better fills the gap between the low-discharge manually operated pumps and high-discharge mechanized pumps.

Renewable energies, in particular solar- and wind-driven pumping, are also pilot tested. In flowing streams, the HydrRam is increasingly used. This pumping device uses the energy from a small fall of water to lift a fraction of the flow to a much greater height (Keraita 2010).

Buyers of these self-supply technologies make their own choice on the single or multiple uses. Such choices are often not much of a concern to the technology developer, manufacturer and seller.

In contrast, multiple uses are at the heart of another form of self-supply: eco-sanitation. Recycling of grey water, drainage and eco-sanitation by households or small enterprises are forms of self-supply that are anchored in the 'local hydrological cycle' of integrated use and re-use of water and related resources for multiple uses. In productive sanitation, the resources in waste are retrieved and used as fertilizer. An example in Tanzania is the EU-funded project Resource Oriented Sanitation (ROSA). In Arusha, for example, sanitation products, i.e. liquid and solid fertilizer produced from urine and faeces is used in peri-urban agriculture. In rural areas, little is known on the status of wastewater reuse at household level. The Stockholm Environment Institute is starting up research on productive sanitation in Tanzania as part of its water supply theme.

A critical question on which hardly any studies could be found regards the wealth class and gender of the adopters. It is plausible that lack of capital for these bulk investments and women's relative exclusion from the circle of innovators and supply chains tend to favor somewhat better off men. This issue requires further empirical study. The access to financing facilities to buy and operate the equipment, but also to buy other inputs for cropping, improved with the growing number of micro-credit establishments, known as SACCOs (saving and credit cooperative organizations). However, the terms and flexibility of the loans may not be sufficient. They may also be too high for the poor. This warrants further analysis.

Further scaling MUS through the modality of self-supply is further supporting the initiatives mentioned above, with a more explicit attention to targeting the poor and women. The rope pump may suit their possibilities best. From a MUS perspective, point-of-use treatment is also particularly relevant. It may offer a solution in both domestic and irrigation schemes where water quality is too low for drinking. By addressing the key issue of clean drinking water, further water development can focus on the quantitative aspects. Support to self-supply has four elements: technology development, setting up a supply chain, financing facilities, and an enabling policy environment. Manufacturers and retailers need to market their produce to create awareness of the product and some critical mass to take off without further support. Subsidies are needed for that period. Subsidies may also continue to be needed for technical capacity building of a larger group of users, retailers and manufacturers. In some cases in which the demand itself has to increase, as for clean water, subsidization may be longer-term. For reaching the poor and including women, subsidization is equally needed. NGOs are now bearing those costs. Government's support for self-supply is still limited. Yet, small-scale self-supply fully meets the policies of supporting farming as a business. More support would address the critique of the widening gaps in productive water use.

5.3 Conclusions scaling self-supply for MUS

Self-supply comes at low or no costs to government. Users make the capital investments and repair and replace the equipment for more sustainable use than government schemes. The actual multiple uses have been addressed in one study only. A better understanding of those uses could identify opportunities for explicit support to synergies. The pro-poor and multiple-use nature of self-supply is clear for rope pumps, which fill the gap between current low-cost and low-discharge hand pumps and expensive mechanized equipment; for point-of-use treatment; and for productive sanitation. So MUS for self-supply can be scaled for these technologies in particular. In supporting further rope pump development, uptake by the poor and women and their multiple uses should be analyzed. In disseminating point-of-use treatment the comparative advantages of disadvantages to other treatment options can be explored, both in areas with and in areas without other improved sources. Lastly, the scope can be assessed for better re-use of water and nutrients in waste at household level in rural areas and at household and larger scales in peri-urban settings. For all self-supply technologies, the financing facilities for the poor need further attention. Government's greater awareness and policy support will further boost adoption.

Self-supply also offers largely untapped opportunities to government and NGOs under the next modality: community-based MUS. These technologies considerably widen the range of options.

6 Potential and barriers for scaling community-based MUS

6.1 Opportunities and Obstacles to Development Tool

We have defined community-based MUS as water services in which public support agencies leave it to communities to decide on the identification, prioritization, planning and implementation of bankable projects for financial support. The choice for domestic-plus, irrigation-plus, self-supply or combinations is in community hands. This process is facilitated and institutional capacity is built. Moreover, for water infrastructure, information and guidance is provided on the technical options, including options for self-supply. Both initiatives in Tanzania that already apply community-based MUS originate from outside the water sector: the Opportunities and Obstacles to Development tool and the Tanzania Social Action Fund. Community-based MUS can be scaled by leveraging these initiatives through integrated support for the water component of these initiatives.

The Opportunities and Obstacles to Development (O&OD) tool is methodological and seeks to integrate participatory planning into existing local government authority procedures and structures, and into existing often already earmarked financing streams. Since 2001, as the first in the world, the Prime Minister's Office – Regional Administration and Local Government developed and implemented this generic national methodology for such participatory planning, in collaboration with Japan International Cooperation Agency. In 2004, guidelines were issued for institutionalizing the O&OD in the local government authorities 'as a basis for devolving powers to people, strengthening democracy, emphasizing human rights and poverty eradication'. In 2007, a more elaborate handbook was published. A review of experiences was done through The Study on Improvements of O&OD Planning Process (PMO-RALG 2008). The O&OD has been rolled out in more than two-thirds of the local government authorities in Tanzania. Line agencies also refer to and implement this tool.

The authors are not aware of studies on the applications of this tool for water. An obvious first step in scaling MUS is to study past experiences with water projects that emerged by applying the O&OD tool – if they exist. Barriers and potentials to full-fledged MUS can be identified in such past experiences. Further pilot-testing of community-based MUS to find solutions to the barriers would lead to a generic community-based MUS modality that can be scaled quickly across Tanzania. Pilot testing would especially highlight where further support to the water component of O&OD is useful.

So the following is generic, but shows that there is all space to identify multiple water needs and explore options for multi-purpose infrastructure. Whether this space is used will depend on the nature of the technical support and information of communities of individual and communal options for multiple uses. Communities also have to unlearn what they were

used to in the past. The passages of the handbook and the review below illustrate some key issues and show how similar these issues are to those already identified in the above-mentioned efforts towards more participatory planning and design. At the end some critiques are mentioned, which also echo the same concerns.

The O&OD tool operates entirely within the local government authorities structures and is in line with Vision 2025 and national plans and budgets. The tool strengthens what is still the weakest link in planning and budget allocation: the link between communities and local government authorities. The rationale of O&OD is to restore the spirit of self reliance, local resource mobilization, and transparency and accountability whereby communities participate in integrated planning, decision making, implementation and ownership of their development initiatives. Community needs are 'multi-sectoral'. For instance, reducing maternal mortality would involve actions by health, education, agriculture (nutrition), infrastructure and others to realize the intended goals. Therefore, coordination is needed to avoid duplication of effort or non-implementation.

The O&OD tool challenges top-down sectoral planning as a main cause of the lack of sustainability. All along, planning in Tanzania has been owned and led by experts from the government and development partners who have always believed they have the control and that they know what the people need and that people do not know what they need. This approach has led to many plans that are not sustainable and have no relevance to the targeted communities, and has also led to smothering the sense of freedom to decide and therefore deleterious to the whole issue of community ownership of development programs. The scenario where people use participatory tools and come up with priorities based on pre-determined interventions perpetuates dependence. Therefore, the scenario should be that people take the lead and make decisions in the planning process. This instills a sense of ownership.

The O&OD planning process is step-wise. After the introduction with all relevant stakeholders, a situation analysis is done. A community map is drawn (on the ground and then copied on paper). This shows important features including compass, boundaries, settlement, present institutions, and different resources. Water supply pipes, streams and wetlands are mentioned in the hand book. (For community-based MUS it is straightforward to complement sources with other water infrastructure and irrigated areas). Opportunities are analyzed before obstacles, in order to invigorate the need to look for homegrown solutions to obstacles to development in the locality. This helps community members to become aware of their own resources and how to make better use of them. Also, the community members carry out a simple analysis of expenditures and sources of income, thus determining what they can do and what they cannot. Prioritization is important to avoid plans that have a large number of projects that are effectively a wish list. By pairwise

ranking the priority activities get most points. In this way three-year community development plans are developed, which are rolling plans that are updated annually.

Accountability is anchored in the procedures. Key responsible persons in a community are chosen. Draft plans and budgets are discussed and vetted by the Village Council and also presented to the Ward Development Committee for technical advice. Then the Village Assembly approves and submits to the district local government authority. For implementation, the Village Executive Officer oversees. He or she reports to the Village Council and the Village Assembly, and submits minutes of the village assembly meeting to the District Council with a copy to the Ward Executive Officer. At ward level, the Ward Executive Officer coordinates the implementation of all community plans in her/his ward, supported by ward facilitators in coordinating, supervising, advising and providing capacity building. Moreover, he/she will monitor that all legitimate village meetings take place as planned, also reporting to the Ward Development Committee. At local government authority level, the District Executive Director forms a core team of 12-15 district facilitators who are under the supervision of the District Planning and Logistic Officer to follow-up on the implementation of community plans. The core team will be responsible for supervising the ward facilitators and for follow up on the implementation of community plans and capacity building at all levels.

In sum, as the review study asserts, the O&OD is one comprehensive development process, so it does not cause confusion to the community; minimizes duplication of activities and saves time; provides for experience sharing; facilitates better use of scarce resources; and enhances inter-sectoral relationship and collaboration. It increases commitment by the communities and the government in implementation of the planned activities; increases transparency in decision making processes; reduces costs of government contributions to delivering services to the communities due to their own contributions in kind and cash.

The review report identifies two weaknesses of this methodology. First, more effort is needed to ‘groom’ the national facilitators, district facilitators and ward facilitators. The second weakness is the matching of community development plans with sectoral funding streams. The report signals a contradiction between community initiative and sectoral approaches which ‘attach importance to effective and efficient implementation of interventions which meet the sectoral objectives and strategies’. ‘To ensure financial accountability, development partners usually rely on the government to systemize a solid planning and budgeting system. This is one reason why each of the education, health and agriculture sectors has a planning system either at the local government authority level or below’. There are less tied funding streams: recurrent block grants, capital development grants and a number of other funding schemes. Formula-based grant transfers are another way for fair and transparent funding. However, various earmarked funding streams mean

that community plans are not implemented according to their priority. For one district with 60 to 100 villages, there is no practical system to sort out and compile all multi-sectoral community plans by sector and funding stream. This sorting has to be handled manually and a number of copies need to be reproduced for each sector division of the local government authority. The report advises to establish a database system to compile community data for planning and budgeting as a first step.

In addition to this internal review and reflection, external parties comment on the O&OD applications mainly because of the problems caused by the lack of clarity on budgets and the complications of sectoral planning and budget accountability. Budget guidelines are delayed and keep changing, so it is difficult for villages to plan. The community plans are often too ambitious compared to available resources. Village-level O&OD plans tend to have only marginal influence on local government authority plans. Local government authorities can change community plans towards national priorities instead of community priorities. Once budgets are allocated, they still tend to change, so clarity and transparency about budgets allocated are lacking. Moreover, the whole O&OD process is expensive and there are not always resources available for it. The latter contributes to the last criticism: vulnerable groups are often marginalised in the process, while elite groups capture the benefits (Taylor 2011). Similar strengths and weaknesses are likely to be found in applications of O&OD for water projects. The proposed first step in scaling community-based MUS, a study of such initiatives, would highlight such issues.

6.2 Tanzania Social Action Fund

The Tanzania Social Action Fund (TASAF) program is the second initiative in Tanzania outside the water sector that leaves the choice of public support to communities. Water development is among those options. TASAF adopts a similar participatory planning approach as the O&OD tool and also works through local government authorities. The key difference of TASAF is that the financing streams to communities, through local government authorities, are pro-actively earmarked for whatever communities have defined as their priority. Funding has no pre-set sectoral strings so matching communities' priorities with sectoral funding streams is smooth and direct.

TASAF builds on a community-driven development operation launched by the government in 2000. Community driven development is a participatory planning method developed by the World Bank. With its pillars of community empowerment, decentralized decision making, accountability, and transparency, community driven development strategies are viable in poverty reduction, accelerate sustainable economic growth and human development. They facilitate decentralization by empowering communities to have a stake in their own development process. They complement market and public sector activities. The community driven development approach believes that strong village governments are the main success factor in mobilizing the required community contributions. With access to

information on principles and procedures, and support from local government authorities, poor communities are prime actors in the development process and creation of assets.

TASAF II, he successor of TASAF I, became effective in 2005 and will last until 2013. TASAF III is envisaged for 2012-2022. Currently, the International Development Agency is the main financer of the National Village Fund, but another half of the funding is added by an increasing number of other development partners, including the World Bank, DFID, and World Food Program. They join the program through 'ring fenced' financing, which may have specific aims, such as forestry development and environmental issues.

TASAF operates at large scales. All interventions under TASAF I and II have reached 20,628,672 people. Between 2006 and June 2011, a total of 12,237 subprojects were received from local government authorities. Out of these 10,526 subprojects have been funded valued at USD 100 million. Besides rehabilitation of roads, the most frequent sub-projects of targeted infrastructure development are, in this order: construction of class rooms, improved water provision, construction or rehabilitation of health facilities, and other. 'Other' includes the construction of few small irrigation schemes.

TASAF has a component of the public works program. This combines asset creation with low-wage employment creation for unskilled workers for labor intensive projects. Communities choose the works. The development and conservation of multiple water sources figure high in TASAF in general and the sub-projects under this component in particular: construction of *charco* dams, small irrigation schemes using both surface and groundwater, small earthen dams, rainwater harvesting techniques, shallow wells, water shed management, water tanks, drainage systems for storm water, restoration of degraded areas, gullies treatment and erosion prevention, windmills, protection of water sources, rainwater harvesting, market shed and associated facilities. These activities help to protect communities both against floods and against the impacts of periods of drought because of improved water retention.

Almost half of the beneficiaries of the public works program are women. Women's participation in decision making, signing of cheques, and leadership also increased to an average of 50 percent. Women started competing with men in leadership positions in community management committees. In some sub-projects these benchmarks were surpassed with women in large numbers.

The main problems are inadequate technical capacity and management skills on project planning, implementation and monitoring of progress in local government authorities at community and district levels, and at community level: insufficient community participation, delays and increase of material costs, and low completion rates. One proposed remedy is to

urge technical and sector experts to orient beneficiaries in drawing up business plans to help them move from receiving grants to expanding business opportunities.

6.3 Conclusion

Attempts to implement community-based MUS may already have reached large scales in Tanzania. Further study of the water components in both O&OD applications and TASAF can assess both the scale and the robustness of what has already been implemented. Comparing the findings from both initiatives deepens insights. In both initiatives, the study should focus on issues already raised, among others: inclusivity in facilitation and targeting; cost-effective facilitation of planning; holistic water source mapping that encompasses domestic water points, irrigation, and livestock watering; administrative data management; swift and transparent clarity on budget availability and allocations; and technical capacity building on technology choice of market-led self-supply. Further, the sustainability of water works realized through public investments, which are often communal, remains a point of attention. A follow-up larger study could compare the sustainability of top-down and bottom-up planned communal works; and compare with individual self-supply technologies.

The key question in the in-depth examination of the water projects in both initiatives is whether and how the untapped opportunities of multipurpose infrastructure design and of integrated management and conservation of multiple sources are tapped. Single-use mindsets may have prevailed both among public service providers and among communities who continue proposing what they used to get in the past. Sector-wise earmarking of funding could have been a main cause of continued fragmented planning. The comparison between the O&OD methodology and TASAF is particularly interesting here. Within the O&OD methodology, some funding streams, as from the Water Sector Development Plan and the Agricultural Sector Development Plan, are strongly earmarked, while other funding is more flexible. The absence of any a priori funding in TASAF is likely to better tap the efficiencies of integrated development, management and conservation of multiple sources for multiple uses. Confirmation of this hypothesis could encourage central planners and development partners to widen or even abandon single-use mandates. Their focus could shift to broader technical capacity and participatory design methods. Dealing with group dynamics, for instance, came up in the interviews as a new skill needed by engineers.

Based on the outcomes of this study, a second step is strategic piloting and exchange to render community-based MUS an even more robust modality in Tanzania. Leveraging the already large-scale TASAF project and the national rural local government authorities, and possibly specific water programs, lessons learnt will be replicable in every rural village.

7 Barriers and potential for scaling MUS in water resource management

7.1 What is scaling bottom-up IWRM in Tanzania?

To complete this MUS scoping study in Tanzania this section discusses a fifth domain of water intervention, where a MUS approach is relevant: the operationalization of Integrated Water Resource Management. The Water Resource Management Act (2009) and the Water Sector Development Plan and Irrigation Policy 2010 adopt IWRM. They operationalize this as a basin approach for integrating multi-sector planning and water resources management that recognizes the economic value of water and ensures sustainability, whilst decentralizing decision-making through subsidiary principles. This interpretation of IWRM has been further operationalized as the 'water resource management' component of the Water Sector Development Plan. This component still awaits donor funding. Concretely, it entails the establishment of a new governance structure: nine basin water boards, reporting to a national water board under the ministry of water. The basin boards have to compile integrated water management and development plans with the developmental and regulatory plans and activities in each basin. At lower levels, catchment and sub-catchment committees can be formed, and at the lowest level water user associations on a voluntary basis.

In the literature and interviews, the concern was raised how these top-down initiatives could reach the majority of water users in the country: small-scale and largely informal water users. As one government official wondered: 'We are holding many workshops with large-scale users, but are we not forgetting small users? How are they represented? Through water user associations? Through civil society? Is their voice really heard in this way?'. The solution that MUS can offer is to recognize communities' own integrated water resource management and the above described move to more holistic service delivery towards domestic-plus, irrigation-plus, self-supply and community-based MUS through local government, as bottom-up IWRM. In this bottom-up IWRM, the national principles of IWRM are applied at the lowest appropriate levels among the country's majority of citizens. This would fill the void and strengthen the implementation of the water resource management component at no extra costs or even save money. Moreover, the artificial separation between water resource management and water service delivery would dissolve. As IWRM implementation is still at an early stage, there is still flexibility to interpret and operationalize IWRM in terms of the existing top-down leg and the proposed bottom-up leg of MUS.

This bottom-up IWRM would entail the following, as based on the findings of the earlier sections.

- Starting at the lowest appropriate level where water management is integrated, which is at households' and communities' level of multiple water uses from multiple sources for livelihoods;
- Recognizing and tapping communities' age-old own social and institutional capital of informal integrated water management; efficient and resilient combination of water sources under seasonal and annual water resource variations; with own conflict resolution mechanisms, well integrated with land and other resources;
- Promoting resource sustainability through water harvesting and storage works, as supported by e.g., the public works component of TASAF;
- Empowering the poor by facilitating integrated participatory planning for improving access to water through new infrastructure, rehabilitation and governance improvements;
- Ensuring inclusion of women and other marginalized groups;
- Prioritizing domestic water uses and small-scale productive water uses for basic human rights and MDGs across the water sector;
- Improving cost-effectiveness through multi-purpose infrastructure (as already practiced for larger-scale infrastructure);
- Delivering integrated services through local government to meet priority needs, while mobilizing own resources; and
- Addressing higher-scale water issues up to national level through already established ward and district councils, line agencies, user organizations, and civil society.

In sum: bottom-up IWRM represents the pull for integration from below, anchored in real-life issues which *are* integrated, and includes the poor. This complements the push for integration from above.

7.2 Basin management and IWRMD plans

As mentioned, the water resources management component of the Water Sector Development Plan focuses on strengthening basin institutions to plan and manage water resources as well as intervening in stress-reduction and priority water resources management and development investments. Plans and implementation are to be specified in integrated water resource management and development plans of each basin. The compilation of these plans is currently being prepared in Pangani, Rufiji, and Wami-Ruvu Basin, where some donor support was available.

The Water Sector Development Plan identifies priority investments in these basins: the rehabilitation of non-functioning systems and the construction of new large-scale multi-purpose storage. For example, in the Pangani River Basin these are for adequate releases for downstream hydro-power plants while promoting upstream irrigation at the same time. A

groundwater assessment is also envisaged. With regard to the regulatory tasks of basin boards, pollution is identified as a concern. In particular, an in-depth assessment is planned in all nine basins to delineate existing and likely hotspots of mercury and cyanide contamination from the large and artisanal gold mining activities. Basin boards are also responsible to issue discharge permits, but they have hardly been applied as yet (TAWASANET 2009). Further, basin boards authorize water allocation. They have to grant permits and monitor and enforce compliance with water use, discharge and borehole drilling conditions stipulated in those permits. Further, the define quantitative environmental flows.

Representation at basin boards is in tiers. At the lowest levels there are the water user associations. They are formed on demand from a group of water users for the purposes of managing equitable allocation of water resources at the local level, especially during drought and for mediating local disputes. This should be in line with water permit conditions. Water user associations also collect water fees. However, registration of water user associations is a cumbersome process. It runs parallel to other registration requirements of irrigators' organizations or even community owned water supply organizations. There are only a few hundred water user associations, mainly for irrigated areas. They are in no way representative for Tanzania's over 10,000 villages.

The legitimacy of basin boards as democratic and accountable institutions is already questioned. Small water users can be represented on basin boards if they cooperate in sub-catchment committees that are represented in catchment committees. Three seats are reserved for representation of catchment management committee members in the basin boards. As yet, no catchment management committees have been established. Even if they are formed, representation through a five-tiered system up to national level is impossible for all practical purposes. At the moment, the catchment management committee seats in two basin boards are taken by the private sector and line ministries. It was also found that only 8 representatives out of 44 in 4 basin boards are women. This is below the formal 30 percent (TAWASANET 2009).

Representatives of local government authorities have only one seat in the basin board, so water resource management institutions largely bypass local government. An initiative is underway to amend the Water Resources Management Act for a stronger representation of local government (Mwaruvanda personal communication). The enormous costs of creating a parallel top-down governance layer can be saved by better using the existing governance structures. For concrete issues that surpass administrative boundaries, coordination structures can be found. Anyhow, most larger-scale water issues transcend basins.

7.3 Water Allocation

Another component of IWRM stipulated in the Water Resource Management Act in Tanzania and vested in basin boards is the issuance of limited time use permits. Colonial powers introduced permit systems (Roman water law) to vest ownership of water resources in themselves. By (paper) law, they dispossessed prior uses by Africans. At independence, ownership of water resources shifted to the state. Customary water law by the millions of small-scale rural water users remained recognized for all practical purposes. Only the formal, larger-scale national and foreign investors applied for permits. The IWRM debates in the 1990s led to a revival of this colonial legal system and now warranted its blanket enforcement in rural areas. Any existing water uses under other legal systems than permit systems are to be converted into permits within two years. So the burden of proof of any existing lawful water use under other plural legal systems has been put on the water user. He or she has to make it recognized under permit systems. For any new water uses, use permits are obligatory as well.

Administrative Roman water law can be said to discriminate small-scale water users for various reasons. The obligation to register or apply for a permit assumes that one can convert customary water rights into Roman law at any short term. It is true that the Water Resources Act allows customary water users to apply collectively, but this requires a complex transaction and is bound to reproduce or strengthen social hierarchies and favor one water use over the other. Moreover, it is unclear what happens if one individual prefers his own individual permit. Permit systems further discriminate because remote, uninformed informal users are less able to meet that demand than the handful of administration-proficient formal large-scale users who are well connected to the basin boards and government. Aware of the logistic nightmare of permitting millions of users, the Water Resource Act exempts the smallest-scale water users from the obligation to register or apply for a permit. However, this weakens his or her position vis-à-vis water users with formal titles. In response to these flaws, various strategies can be taken.

Some NGOs propose to support those who are discriminated to join permit systems. Another strategy is to challenge permit systems per se. It has become clear that permit systems have already run into insurmountable logistic problems. As the Water Sector Development Plan states:

> The WRM Act (2009) requires all unrecorded rights to be registered within 2 years of the Act coming into force (August 1st, 2009). This is a legal requirement whose implementation requires adequate resources to implement specific activities including: awareness creation, extensive water use surveys and verifications, inventory of water uses, stakeholder consultations and engagements (with those with rights and those without water rights) through

> participatory processes. To implement this requirement of the WRM Act (2009) it is estimated that a total of USD 4.5 million is required for all nine basins. There is, however, no allocation for this vital activity within the approved WSDP financing framework.

We note that comparison with other administration requirements shows that just the registration of hundreds of thousands of individual water users may already be much more expensive than suggested here. Just the mapping of water points already appeared very resource intensive and difficult to keep updated. Community owned water supply organizations fail to get their certificates. Even irrigation organizations or water user organizations are hardly registered. Going beyond merely registration and entering into legalities is even more complex. Compared with the conversion of customary land tenure into title deeds at village level with clear boundaries, water titling is a mammoth task. Water is fugitive and largely uncontrolled in rural Tanzania. Average annual water volumes allocated in a permit have no meaning for managing water scarcity during the dry season. The early experiences with issuing just a few permits already show over a year of delay in allocation. Basin boards and officers simply cannot equitably reach the majority of small-scale users – which is neither the fault of the basin board or officer nor the small-scale users. For decades to come, it will be at best the administration-proficient minority who gets permits. The risk is real that they will use this first-class entitlement to claim priority rights over those without a permit at the expense of the poor, especially women who are not the head of a household. If they are the only ones to pay for the functioning of basin boards and offices, their influence will be more disproportionate.

MUS as bottom-up IWRM can fill this gap. MUS articulates customary and informal integrated water uses and management as the formal basis for service delivery through local government. The O&OD promotes communities' formal recognition. Obliging everyone to prove and apply for a permit every number of years contradicts this recognition. Legally, this would imply that government exempts many more small scale uses from the obligation to apply for a permit. A yardstick could be those uses that are logistically impossible to register anyhow. The issue is protecting small-scale uses. This can be achieved at much lower costs. The Water Resources Management Act gives top priority to water uses that meet basic human needs. Literally, this would include basic human health and socio-economic rights, as in article 4.1.a of the WRM Act (2009). However, this is contradicted in Article 6.2.a and b, where only domestic uses get such priority. Although small-scale users hardly contribute to any quantitative over-use, environmental flows are given the second priority. Instead of curtailing the over-users, the small-scale users and victims of such overuse are blamed. This can be overcome by giving a higher priority to domestic *and* productive uses to meet basic human needs than environmental flows. Such priority can be enforced in reality at low cost by shifting the burden of proof of 'no harm to basic livelihood

needs' to any large-scale water user who wants to take up a new water use. Tanzania's scarce public regulatory resources can be targeted to enforcing such obligation.

Lastly, MUS as bottom-up IWRM also solves the various contradictions around the charging of water fees as condition of permits. Use of raw water for urban supply, irrigation, hydro-power generation and other uses are being charged. Water fees are also charged for self-supply, so the investments in the water use are entirely borne by the user. The discharge of treated wastes is also being charged. The income from these water-use permits and wastewater discharge permits are retained within the basins and used to support costs of managing the basins' water resources. The target is to meet not less than 30 percent of total basin operational cost by 2012 for the Rufiji, Pangani, Wami/Ruvu and Lake Victoria basins, after which this target is to be achieved gradually in all nine water basins. Thus, the IWRM discourse introduced the notion that water use is only lawful if one pays the state. International notions of economic scarcity value and taxation got firmly entrenched in a legal system that defines the legitimacy of claims to water. The legitimacy of water use is determined by the scarcity value of water, water pricing, cost sharing, and other incentives for what is seen as 'promoting the rational use of water'.

However, the state is logistically unable to identify, register, issue a permit to the majority of small-scale uses, let alone to charge them. Moreover, charging fees from many remote, scattered informal users is likely to cost more than the revenue it provides. A disconnection between a water law and a taxation measure can solve this. A lean simple taxation system would focus on the few large-scale users who derive most of the financial benefits from their large uses. This generates more net revenue for government. For the majority of small-scale rural users, MUS as bottom-up IWRM would fill the void. Instead of trying in vain to get a revenue stream upwards, bottom-up IWRM would align with most other efforts of government and development partners: creating an accountable financing streams downwards for meaningful water services delivery. Decentralization of revenue generation by district-level governments for sustainable water services and management are the issues.

In sum, communities' current water management and many partners' efforts towards bottom-up water services delivery through the democratic representation of district councils already meet the aims of the Water Sector Development Plan. In any case, they do so more effectively than the extra governance layer of the five-tiered basin institutions can do in any near future, if ever. Leaving lower-level issues to existing democratic councils and civil society implies that basin boards can focus their limited resources on higher-aggregate level issues, such as large-scale infrastructure development and regulation of the few large-scale polluters and users, who may pose the most tangible public threats to equitable water management. In this way, MUS strengthens IWRM.

8 Conclusions and networking

The potential for scaling up all four MUS modalities in Tanzania are high. We recap the proposed scaling pathways.

For scaling domestic-plus within the WASH sector, a calculation of the multiple-use water ladder for the national context is proposed as advocacy both to indicate how more livelihood benefits can concurrently be generated and which net benefits are derived. This is the basis for the next step of pilot testing with any partner interested. Pilot testing would give further answers to the potentials identified. This includes the impact of income generation on the payment of fees and on mitigating scheme dysfunctionality. The barrier of single use earmarks of most WASH sector funding can be solved by widening livelihood benefits. Moreover, for sustainability, central-level accountability based on single (or multiple) uses can be replaced by accountability enshrined in inclusive targeting and transparent bottom-up planning procedures as the O&OD tool envisages. A barrier to test in particular is whether and how equitable targeting of public resources can rapidly reach the excluded with higher service levels. Water quality issues need to be further specified. The potential of point-of-use treatment also needs further unraveling. Generic models from these pilot tests, with answers to these issues, can be scaled across the active WASH sector.

Irrigation- and livestock-plus are already widely practiced and the broader livelihoods are well recognized by the 'livelihood engineers' in the agricultural divisions. However, non-irrigation uses are addressed 'on the way'. A first step towards irrigation-plus is to systematize these practices, including homestead-scale irrigation. Policies should become more articulate, and also inform the irrigation basket-funded programs so that they formally widen their single use mandates. The second step is in collaboration with the WASH sector and PRO-RALG on the following two common issues across the country. In-house technical capacity to support local government authorities and communities for infrastructure design is vital, but limited. Moreover, engineers need to be trained on multipurpose infrastructure and participatory design. The latter is bound to highlight multiple water needs. In the short term, therefore, a discussion is proposed with Tanzania's senior engineers on whether and how to place and train engineers at district, ward, and village levels as mutually replaceable civil engineers for participatory multi-purpose designs.

The second issue that can be addressed most fruitfully jointly by both sectors concerns equity. Currently, the sectors' visions on equity by the same people for the same water sources diverge. The irrigation sector lacks an aim to reach everyone who would want to use water productively with minimum-level services. Moreover, inequities in water use are already much wider in the productive sphere than in the domestic sphere, because those with more land and other assets are also able to use more water. The new emphasis on

local government authorities to plan and implement irrigation with a stronger say and payment by farmers may further self-select the relatively wealthier. One option for further consideration (which is equally relevant for the next two modalities) is to expand the national legal priority for domestic uses to also include small-scale productive uses for basic human socio-economic rights. Related to this is the question of how priorities can be enforced by all public interventions, if hardly any knowledge exists on how communities factually allocate water in periods of stress.

Self-supply for MUS has been introduced by the iWash project, which developed a market-led supply chain development of affordable privately-owned technologies, such as rope-and-washer pumps and water filters. Other NGOs and institutes, including the Stockholm Environment Institute, support the widening of the range of technologies, also for eco-sanitation. Technical capacity building empowers many local technicians and villagers. Scaling of this MUS modality is: further supporting these initiatives through technology development, market-led supply chain development, financing facilities and an enabling policy environment. However, the multiple use character of different technologies should be better documented for identifying further synergies.

Community-based MUS has a remarkably high potential in Tanzania because of two large-scale initiatives for participatory planning in which water development is one of the emerging options. The Opportunities and Obstacles to Development tool operationalizes integrated participatory planning to strengthen the weakest link, which is the link between local government authorities and villages in all rural areas. The Tanzania Social Action Fund provides funding without any strings, also based on community identified projects. A study on the water projects implemented through the O&OD tool and TASAF is proposed to further highlight whether and how the institutional space is actually used to design cost-effective multi-purpose infrastructure, efficiently combining multiple sources. The study should examine the ways in which sector-based funding is likely to stifle integrated village initiatives in the O&OD methodology. In contrast, untied funding under TASAF could solve those issues. The issue of integrated technical and institutional capacity building through local government authorities is similar to domestic-plus and irrigation-plus. On the basis of the comparative research findings action-research can be taken up to pilot test full-fledged community-based MUS. This will strengthen both initiatives. National advocacy and learning of the generic modality identified will inform the domestic-plus, irrigation-plus and self-supply scaling endeavors. Lastly, these experiences can corroborate how bottom-up integrated water development and management with a strong focus on service delivery for livelihoods already exists. This renders it an even stronger solution to fill the current local void of top-down integrated water resource management.

Without earlier national dialogue on MUS in Tanzania, the implementation of these MUS scaling pathways critically depends on buy-in by all key stakeholders. As the modalities are closely related and as MUS increases the demand for the other sector's expertise, dialogue across the modalities is vital. A learning alliance network can steer dialogue, fine-tune scaling pathways, design strategic field testing, share study results and other experiences and, for all activities, mobilize resources and leverage ongoing initiatives.

A national workshop could launch this network. As preparation, a discussion document can be compiled to sketch the state of the art on MUS barriers and potential in Tanzania. The present scoping study report can serve as a basis, after receiving feedback from all resource persons and networks, including TAWASANET, AGRA, and the development partners group. Government, NGOs and development partners who can financially support such an initial exchange or one or more of the steps in the scaling pathways need to be identified. IWMI Southern Africa and SEI Tanzania are knowledge centers linked to the global MUS Group, so they are well placed to facilitate these first steps. SEI Tanzania works in an integrated manner on water supply and sanitation; water for agricultural, growth and livelihoods; energy; and climate change. SEI has been involved in MUS research since 2000 in South Africa, Nepal, Cambodia and Vietnam (Soussan et al 2003; 2004; Noel et al 2010). Both IWMI and SEI are core partners of the global MUS Group. They will facilitate that the national learning alliance network benefits from the international experiences coordinated by the global MUS Group (www.musgroup.net).

Table 3 lists the persons and institutions who are recommended for such network.

Table 3. Potential partners for a MUS learning alliance in Tanzania

Name	Designation	Phone/ Mobile +255 (0)	email
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Eng. Bashiri Mrindoko	Ministry of Water rDeputy Permanent Secretary	754 - 784958	dpsmow@mowi.go.tz
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Dr. Philip Mpango Eng Happy Mgalula.	Prime Minister office Regional Administration and Local Government Planning Commission		
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JICA	Officer on Opportunities and Obstacles to Development		
TASAF	Program officer		

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