

Multiple-use Water Services, Livelihoods & Health – a Two Country Study

The Water Supply and Treatment Group partnered with USAID and the GLOWS programme to evaluate the impact of multiple-use water services in rural communities throughout Burkina Faso and Tanzania. Sara Marks¹, Ariane Schertenleib¹, Honoré Biao², Kees Vogt², Boukari Salifou², Muganyizi Ndyamukama², Ilyasse Kabore², Emily van Houweling³, Vincent G. Vyamana⁴, Vivienne Abbott⁴, Mary Renwick²

Introduction: MUS versus business as usual

Multiple-use water services (MUS) is an integrated water service delivery approach that takes into account households' range of needs when planning, financing and managing water services. As compared to the standard model for rural water supply planning, MUS recognizes household- and community-level synergies among domestic and productive activities with water. Past studies have shown the benefits of MUS in terms of enhancing water-based income generation [1, 2], especially in the presence of enabling factors, such as markets and electricity [3]. In rural Senegal, productive uses of water were linked to improved livelihood diversification among women [4] and technical operation of water systems [5]. Yet, little is known regarding other potential MUS benefits beyond income and livelihood. A better understanding of the poten-

tial benefits arising from MUS projects is essential for justifying the relatively expensive upfront investment required to establish this higher level of water service.

MUS in Burkina Faso and Tanzania

The objective of the study was to rigorously assess the impacts expected to arise from MUS, including improvements in child health, safety during water collection, food security and nutritional status [6]. Sandec's Water Supply and Treatment group collaborated with USAID and the GLOWS programme, as well as partner organisations Winrock International, Virginia Tech, and Florida International University, to systematically evaluate the MUS component of two rural water supply programmes.

The first programme, the West Africa Water, Sanitation and Hygiene (WA-WASH) programme in Burkina Faso, launched in 2011 and offered households the option to invest

in a subsidised self-supply option (upgraded private wells equipped with rope pumps) along with other programme activities. The second programme, the Integrated Water, Sanitation and Hygiene (iWASH) programme in Tanzania, launched in 2010 and used a demand-led approach to engage community members during the installation of new or upgraded communal water supply systems (reticulated networks, upgraded wells with rope pumps, and/or livestock troughs). Both programmes featured "MUS impact boosting activities" tailored to local conditions, such as seed distribution networks, market garden demonstrations, support for improved poultry housing (kinengunengu) and livestock husbandry (Photo 1).

Study design and methods

Baseline (pre-intervention) data on outcomes of interest were not collected prior to the launch of the programmes, making it not possible to directly measure the before-after status of households receiving MUS. This study instead relies on a two-step strategy to estimate impacts: (1) randomised sampling of various MUS typologies, as well as a control group, and (2) statistical matching techniques. This article reports results for the first step only.

Communities participating in iWASH and WA-WASH at least one year prior to the study could enrol in the treatment group. Communities located within the programme area that qualified for participation, but had not yet applied, were eligible to enrol in the control group. The communities were selected purposively to optimise variation in the intervention(s) received and ensure accessibility to the research team.

Based on community visits and discussions with field staff, the study team pre-defined and randomly sampled several household typologies. The WA-WASH household typologies were: (a) investors, (b) neighbours of investors (i.e. those accessing an investor's upgraded well), or (c) non-neighbours (i.e. those who did not invest in, nor use an investor's upgraded well). In iWASH, the household typologies were: (d) those living in



Photo 1: WA-WASH and iWASH impact boosting activities, e.g. support for market gardens and poultry and livestock husbandry training.

| Category | Household typology | Household interviews | Focus group discussions | Key informant interviews |
|---------------------------------|-------------------------------|----------------------|-------------------------|--------------------------|
| WA-WASH (19 communities) | a. MUS investors | 146 | 8 | 19 |
| | b. Neighbours | 292 | | |
| | c. Non-neighbours | 451 | | |
| iWASH (7 communities) | d. MUS interest group members | 322 | 0 | 7 |
| | e. Non-members | 410 | 0 | |
| Control (12 communities) | f. Control | 1083 | 0 | 12 |
| Total sample size | | 2704 | 8 | 38 |

Table 1: Household typologies and sample sizes for WA-WASH and iWASH.

iWASH communities who were members of MUS interest groups or (e) those who were not members of a MUS interest group. In both countries, households located in communities not participating in the programme were defined as: (f) control households (Table 1). Between May and October 2015, field teams conducted 2704 household interviews. Surveys probed on the water sources used throughout the year for any purpose, health status, self-reported food security, and other measures of well-being. In addition, semi-structured interviews were held with a key informant in each community to estimate population, proximity to markets, and other community-level measures. Focus group discussions were held with men and women in Burkina Faso to better understand the changes experienced since their participation in WA-WASH (Table 1).

Key findings

Illness and injuries. As compared to control households, MUS households reported fewer episodes of diarrheal and respiratory illnesses in the past week, as well as fewer injuries due to fetching water. In bivariate tests, only the difference in the rate of injuries among households in the iWASH programme (3%) and control communities (12%) was statistically significant ($p < 0.05$). Other health measures were not found to be significantly different across MUS and control communities.

Food security. The survey asked respondents to rate their own household's food security in the past year and interviewers explained the concept of food security in the local language. Results show that whereas food insecurity existed to some extent in all communities, the share of households identifying as insecure was significantly lower within communities receiving MUS. For ex-

ample, within iWASH communities, 84% of MUS interest group members identified as "very secure," while 65% of non-members reported the same.

Nutritional status. The household survey included a standardised set of items to assess the overall nutritional status of women of reproductive age [7]. Three measures were analysed: (1) the total number of food types consumed in the past week, (2) consumption of animal products (meat, milk and eggs), and (3) consumption of leafy green vegetables. Statistical comparison revealed that overall dietary diversity was somewhat greater among households in iWASH, as compared to control households. In both programmes, households receiving MUS were more likely to have consumed animal products in the past week, as compared to control households. For example, 92% of WA-WASH investors and 91% of iWASH interest group members had consumed meat, milk or eggs in the past week, as compared to only 82% and 77% of control households, respectively (Figure 1).

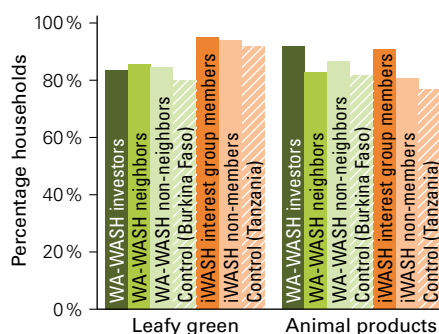


Figure 1. Share of households consuming leafy green vegetables and animal products within the past week.

Policy message

Our preliminary analyses of these two large-scale MUS programmes in Sub-Saharan Africa are limited due to the lack of controls for potential confounding factors. Nonetheless, direct comparisons across various household typologies reveal a consistent trend demonstrating the benefits of MUS one to four years after programme implementation. Households participating in WA-WASH and iWASH experienced fewer injuries while fetching water, were more food secure, and were more likely to consume protein-rich foods. These results expand the growing evidence base regarding the benefits from higher levels of water services in rural communities globally. In future analyses, we will use multivariate statistics to minimize bias and to investigate the potential spillover effects of MUS among neighbouring households.

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- [7] FAO & FANTA. (2014): Introducing the Minimum Dietary Diversity–Women (MDD-W). Global Dietary Diversity Indicator for Women, Washington, D.C.

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