Linking multiple use services and self supply principles[1]

By: Marieke Adank, IRC International Water and Sanitation Centre

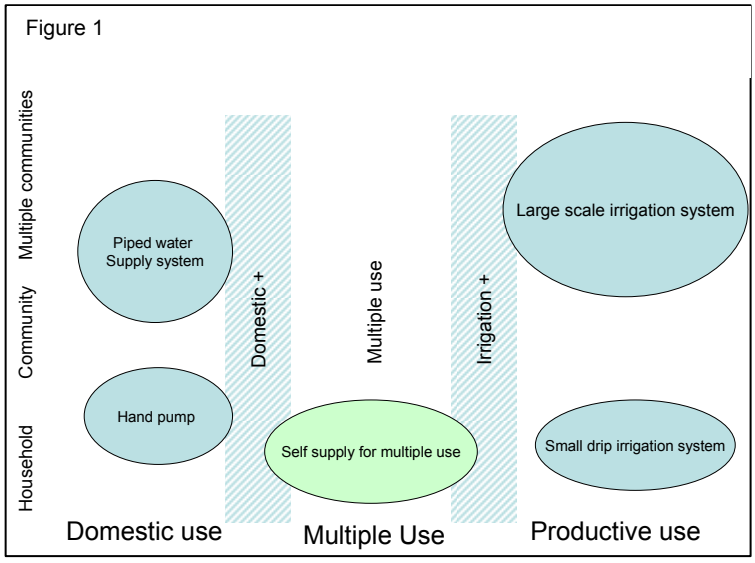
Abstract

Multiple Use Services for water (MUS) is an approach which takes into account that people use water for multiple purposes, which can bring them multiple benefits. Self supply is an approach to water supply which concentrates intervention and management at household or small group level. This paper intends to explore some links between these approaches by looking at two cases. The first case illustrates the influence multiple use has had on the wide uptake and sustainability of rope pumps in Nicaragua. The main reason for its high social acceptance and wide uptake was that the rope pump provided an opportunity for irrigation and watering livestock, making rope pump production economically viable. The second, presents the case of family wells in Zimbabwe, where household owned wells are commonly used to serve multiple purposes. The paper finally explores opportunities and challenges of MUS through self supply, such as water quality issues, reaching the poorest and its scalability.

Introduction

People in rural areas need water for both domestic purposes, like drinking, cooking, washing and cleaning, as well as for small-scale productive activities, such as backyard gardening, livestock keeping, processing of agricultural products and small scale industrial activities like beer brewing and brick making. These multiple uses of water have multiple benefits. These benefits can include improved health situation with respect to water and hygiene related disease, but also economic benefits (income generation) and improved nutrition and food security.

Figure 1



However, water programmes generally do not address these multiple needs in an integrated way, therefore not capitalizing on the full range of potential multiple benefits (Moriarty et al 2004). Programmes typically have a narrow sectoral focus, seeing the world in terms of water and hygiene related health benefits (domestic use) ór food security and economic benefits (productive use). This results in sectoral biased systems and services accordingly. Programmes focussing on domestic water use do not include people's water needs for productive uses in their technology designs, or they may even explicitly forbid productive use. Programmes related to productive uses of water, like irrigation programmes, often disregard use of this water for domestic purposes. In reality though, people do tend to use domestic systems widely for small productive uses (domestic +), while using water meant for productive uses (like irrigation water) is also often relied upon for domestic uses (irrigation +) (Van Koppen et al 2006) (see figure 1).

When water supply programmes fail to take productive uses into account, this will not only prevent them from having their full potential impact on poverty reduction and livelihoods, but can even have a negative impact on sustainability of water supply facilities. It may put extra pressure

[1] Paper prepared for 5th Rural Water supply Network Forum that took place 27 - 30 November 2006 at the La-Palm Royal Beach Hotel, Accra, Ghana.

on services when these are under-designed for the multiple needs that people have. It also leaves users with the responsibility of owning and managing systems that only partially meet their needs, which can have a negative effect on operation and maintenance. In response to this situation, a number of organizations, including IRC, IWMI and Plan International, have been developing and advocating for a so-called MUS (Multiple Use Services) approach. This is an integrated bottom-up, pro-poor approach to meeting poor people's water needs for multiple purposes (Van Koppen et al., 2006).

Self supply is an approach to water supply that concentrates intervention and management at household or small group level. It builds on the widespread desire of the rural poor to invest in solutions that benefit their household or small group directly, rather than as members of larger communities (Rural Water Supply Network, 2005; Sutton, 2004), normally involved in conventional water supply programmes. This paper will focus on the links between the two approaches. It will look into how the concepts of multiple use and self supply are linked in practice and what are some of the challenges in a combined approach. The paper looks at two cases in which self supply has played an important role in ensuring water supply facilities at household level, that are used for both domestic and productive uses.

Case 1: Rope pumps in Nicaragua

The rope pump is not a new invention. Its principle was already known two thousand years ago in China, where it was mainly used for irrigation purposes to lift water from low heads (maximum of 6 metres) at high flow rates (up to 180 litres/min for a 2.4 metres head (Arlosoroff et al 1987). A major revolution took place in Nicaragua during the 1980s with the invention of a rubber washer made by injection moulding. This enabled a dramatic increase in the potential height of lifting, to up to 60 metres (Alberts 2004). This innovation transformed this pump mainly used for irrigation into a hand pump suitable for lifting deep groundwater, that is normally suitable for human consumption. This made the pump very popular with a range of users, including small and large scale farmers, who used the rope pump at household or small group level to supply water for domestic uses, irrigating small plots and for watering animals. This process, based on the demand of private users and supply by private manufacturers, and the accompanying promotion campaign during the initial stages, caught the attention of several NGOs and later on the national W&S sector. By the mid-1990s, the implementation of rope pumps was taken up by the water and sanitation sector usingf hand dug wells and boreholes at household and community level. By 2000 it had become practically the national standard.

By 2003, the total estimated number of pumps was about 25,000. Government programmes contributed to about 31% of these and NGOs and projects to about 50% of the pumps. The remaining 19% of the pumps were bought by individual households through their own investments. Within programmes and projects, user contributions to the capital costs of rope pumps have been considerable as well. Different contribution percentages (commonly higher than the 5-10% contribution applied in hand pump programmes) and a variety of conditions and down-payment periods were used, but in general a recovery percentage of 90 to 95% of the amount agreed on was reached.

Besides the fact that the rope pump in Nicaragua is a very good example of a nation-wide scaled-up technology, in which self supply has played a big role, it has also been very successful in terms of sustainability. About 90% of the pumps installed on drilled wells were found operational, as were 80% of pumps on hand-dug wells (Alberts and Van der Zee, 2004).

The high scalability and sustainability of the rope pump in Nicaragua is related to a number of factors. The pump was manufactured and marketed by private enterprises from the start, without undue interference by government. Furthermore, the costs of the pump are within reach of the poor (though not the poorest) and users can themselves repair the pumps at hardly any cost. However, Alberts and Van der Zee (2004) identified that the main reason for its high social

acceptance and wide uptake was that the rope pump provided an opportunity for irrigation and watering livestock, making rope pump production economically viable. Also, sustainability was found to be highly linked to potential to be used for multiple uses, as this was the main factor building a sense of ownership and the consequent willingness to maintain the facilities, even more so than the contributions of the owners to the installation costs.

Of the total of over 25,000 rope pumps that had been installed, at least 20,000 could be considered to generate an additional income of US$225 a year through use of the pump for small scale agriculture and watering livestock. This represents about 50% of the total annual income for the lower income groups, which clearly indicates the difference the pump makes in the livelihoods of poor people in Nicaragua.

Case 2: Family wells in Zimbabwe

Family Well programmes in Zimbabwe are a good example of household-initiated self supply, that have been widely taken up. Based upon traditional practices, family wells started out as shallow dug wells without any form of protection, constructed by households and based on their desire to have water available closer to their homes. These shallow wells were generally not lined and unprotected. Through actions in the early 1990 of professional hygiene educators and through Well Upgrading[2], more emphasis was put on protection and hygienic use of wells. That included simple measures like lining the bottom of the well and covering the well when not in use. With those simple upgrading techniques, family wells have spread over many parts of the country (Guzha et al, 2007 forthcoming). Family well programmes are promoted by both NGOs, and the Government of Zimbabwe through its Integrated Water and Sanitation Programme. In both cases, user contributions are set at 70% with an average cost of 211 US$. There are many other individual families who have developed and financed their own family wells without outside assistance.

Family wells are constructed close to the homestead where productive activities take place. The wells don't have to be shared by a larger number of users and all water can be applied within the family's activities. Where the available quantity of water from the family well allows it, families have taken the opportunity to develop small vegetable gardens for home consumption and for the market. Water is also used for watering livestock and small scale home industries such as welding, brick moulding construction work and beer brewing. A survey carried out by the NGO Mvuramanzi Trust in 1998 and 1999 in one district, revealed that 75% of the families they had assisted were using the water for these types of productive uses (Guzha et al, 2007 forthcoming).

The extent to which family wells are used for productive uses is largely determined by the way in which water is abstracted and distributed. The windlass and bucket system is very common as it is a cheap and simple way of extracting water from the well, but abstracting large quantities of water for multiple uses is time consuming. Therefore, family wells are increasingly being upgraded by lifting devices such as the bucket pump or the rope pump. This has allowed families to connect family wells to in-house distribution schemes, so that water can be used for bathing, laundry and kitchen use, but also to increase their use of the water for other (productive) uses.

Fitted with a windlass, a family well can be used by 2-3 people using buckets to irrigate a plot of 300 m2 (0.03 ha) at a watering rate of 25 mm per week, which could generate an income of US$ 75 per year. Where the family well is equipped with a simple rope and washer pump, the watering capacity can be increased from 0.1 litres per second to around 1 litre per second. This makes it possible to water an area of at least 2,400 m2 (0.24 ha), which is eight times the area that can be managed with buckets and with eight times the returns (giving a yearly income of about US$

[2] a simple technique of protecting family wells developed by the Ministry of Health, through the Blair Research Institute the early 1990s

600). Well organised, hard-working farmers can irrigate even larger areas and achieve even higher incomes, where markets permit (Robinson et al 2004).

Self supply and MUS: opportunities and challenges

In both the above cases, multiple use of water was stimulated by the fact that households or small groups were themselves responsible for the implementation, operation and maintenance of their own water supplies. People providing for their own needs through self supply are not limited by a specific sectoral focus, like regular water programmes. In the Nicaragua case, people were using rope pumps they had purchased or built with their own means for multiple uses, before these ideas were taken up by the formal water supply sector agencies. In the Zimbabwe case, self supply enabled the construction of facilities close to the place where small productive uses take place (the homestead). The lack of more complicated communal managed systems in these cases allowed households to use water for multiple uses.

The above cases have also shown that in turn, multiple use of water plays an important role in stimulating and enabling self supply. People are more interested in investing in their own facilities if they foresee multiple benefits. Especially the prospect of increased family income will stimulate self supply. Also the increase in family income and multiple dependencies on the facilities have a positive effect on operation and maintenance.

However, reaching the very poorest within the community remains a mayor challenge. Despite the prospects of increased household income through multiple use of water, very poor households will have difficulties in mobilizing the initial investment costs for self supply or multiple use facilities. Micro-credit schemes can be useful to overcome these initial hurdles. Micro-credits are not commonly used in the water supply sector, but are quite common elsewhere in rural development. Multiple uses of water could contribute to the recovery of initial investments and may facilitate the repayment of capital also.

Water quality is often raised as a challenge for both self supply as well as multiple use of water approaches. Self supply is critiqued because ensuring that water quality meets national standards is difficult, while a multiple use approach of water is often accused of stimulating the use of expensive high quality water for uses that are better suited for expensive water. However, whether water is supplied though self supply or through communal systems, and whether it is used for only domestic or for multiple uses, achieving drinking water quality is in practice almost always a household level activity, where good hygiene education is key (Moriarty et al 2004) .

In some cases, the quantity of water available can also be a challenge, which can lead to a fear of over-exploitation and conflict over water resources when households or small groups use their private facilities to use water for multiple purposes. Although, in general, extracted amounts are often likely to be too small to really have a negative effect on the resource availability, perceived over-exploitation can lead to conflict. To overcome this challenge, community level planning processes might be important, to complement the self supply process. This implies taking into account all water sources (including alternative ones, like rainwater) and their uses.

Finally, there is the challenge of scaling-up self supply for multiple use services. To achieve scaling up, government and private sector buy-in and support will be essential. Private sector promotion and development will cost time and money (costs of setting up rope pump production units in a new area, including promotion, were in Nicaragua estimated to be in the range of US$50,000 to US$100,000 (Alberts and Van der Zee, 2004)). Documentation of successful cases and sharing of experiences could stimulate government and private sector willingness to support a self supply approach to multiple use services. An example of a platform for sharing experiences of multiple use services, is the MUS Group (www.musgroup.nl), while the Rural Water Supply Network provides a platform for discussion on self supply. Clearly, synergy could be found through more intense sharing and collaboration between the platforms.

References

Alberts, J.H.and J.J. van der Zee, *A multi-sectoral approach to sustainable rural water supply: the role of the rope handpump in Nicaragua*, In: Moriarty, P., Butterworth, J., Van Koppen, B., (eds.), 2004, Beyond Domestic, Case studies on poverty and productive uses of water at the household level, Technical Paper Series 41, IRC International Water and Sanitation Centre, Delft, the Netherlands. http://www.irc.nl/page/6129

Alberts, H., (2004) *The rope pump an example of technology transfer*, *Waterlines*, vol.22 No.3, pp. 22-25.

Arlosoroff, S., Tschannerl, G., Grey, D., Journey, W., Karp, A., Langeneffer, O. and Roche, R. (1987) *Community water supply: The handpump option*, The World Bank, Washington DC, United States

Guzha, E., Chimbunde, E., Khoza, S. and S. Smits (2007 forthcoming) *Technologies for multiple use systems; experiences from Zimbabwe*, MUS project Working paper, Mvulamanzi Trust, Harare, Zimbabwe, forthcoming www.musproject.net

Koppen, B. van, Moriarty, P., and E. Boelee. (2006) *Multiple-use water services to advance the millennium development goals*. Research Report 98. Colombo, Sri Lanka: International Water Management Institute. http://www.musproject.net/page/571

Moriarty, P., Butterworth, J., Van Koppen, B, Soussan, J. *Water, poverty and productive uses of water at the household level*, In: Moriarty, P., Butterworth, J., Van Koppen, B., (eds.), 2004, Beyond Domestic, Case studies on poverty and productive uses of water at the household level, Technical Paper Series 41, IRC International Water and Sanitation Centre, Delft, the Netherlands. http://www.irc.nl/page/6129

Robinson, P., Mathew B., Proudfoot, D., *Productive water strategies for poverty reduction in Zimbabwe*, In: Moriarty, P., Butterworth, J., Van Koppen, B., (eds.), 2004, Beyond Domestic, Case studies on poverty and productive uses of water at the household level, Technical Paper Series 41, IRC International Water and Sanitation Centre, Delft, the Netherlands. http://www.irc.nl/page/6129

Rural Water Supply Network (2005) *Self Supply - Small community and household water supplies*, Concept Note, http://www.rwsn.ch/documentation/skatdocumentation.2005-11-14.5396467659/file

Sutton, S., (2004) *Self Supply: A Fresh Approach to Water for Rural Populations*, Field note, WSP, Nairobi, Kenya, RWSN, St. Gallen, Switzerland