

Evaluation Insights



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This paper draws on a review carried out by the Policy and Operations Evaluation Department (IOB) of the Ministry of Foreign Affairs in the Netherlands. The views expressed in this paper are those of the authors and do not necessarily reflect the policies or positions of the OECD, of the DAC or of their member governments.



Rural Water and Sanitation

Assessing impacts

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The Millennium Declaration of 2000 and the subsequent effort to achieve the Millennium Development Goals (MDGs) gave new impetus to long-standing efforts by governments and other development actors to enhance access to water and improve sanitation. The goal was to deal with this central cause of poverty and sickness for millions of people – especially children and women – around the world. Under MDG 7 “Ensure environmental sustainability” the world set itself the target of halving the proportion of people without sustainable access to safe drinking water and basic sanitation by 2015.

These new efforts built on decades of international co-operation in the water and sanitation sectors (Figure 1). The government of the Netherlands, for instance, has been providing assistance in the sector for some 50 years. Dutch rural water and sanitation policies have shown a typical trajectory: from an early technocratic emphasis on building infrastructure, to a growing concern with the social, institutional and behavioural factors that so strongly influence the sustainability and effectiveness of water and sanitation interventions. These global efforts have had mixed results. According to the United Nations (2011), there has been good progress with regard to drinking water but much slower progress on basic sanitation, particularly in rural areas (Box 1).

Some efforts in rural water and sanitation have lacked a clear focus on learning and results – including understanding what works and why, in what contexts, and how the best impacts can be achieved with resources invested. To remedy this, dozens of evaluations have been carried out (see the OECD DAC Evaluation Resource Centre (DEReC)) and there have been recent efforts to take stock of evidence (KfW and IEG, 2011), including with systematic reviews (Waddington *et al*, 2010). To add to this evidence base, the Dutch government, working with its development partners, evaluated the impact of programmes in five countries: Benin, Egypt, Mozambique, Tanzania and Yemen. These and other recent studies informed a policy review. This note summarises the main findings of the evaluations and describes emerging lessons.

**Box 1. Progress on Water and Sanitation
Millennium Development Goal 7**



According to the United Nations MDG report (2011), progress has been good on increasing access to clean drinking water. The global target is likely to be surpassed, although rural areas are lagging behind and more than one in ten people may still not have full access

to safe drinking water by the 2015 deadline. While some regions, such as east and south-east Asia, have already gone beyond the target, progress varies widely. Sub-Saharan Africa remains far behind: Despite having almost doubled the number of people using an improved water source between 1990 and 2008, coverage was still only 60% in 2008. The 2011 report shows slower worldwide progress with regard to basic sanitation, where the picture is quite bleak. The percentage of the world's population using an adequate toilet rose just 7% from 1990 to 2008, from 54 to 61%. Almost half the population in developing regions do not have access to sanitary facilities, and an estimated 1.1 billion people practise open defecation, exposing themselves and their communities to major health risks. In sub-Saharan Africa, only 24% of the rural population were using an improved sanitation facility.

After a dip in the 1990s, external assistance to water and sanitation has risen sharply since 2001 (Figure 1). Annual average aid commitments to water and sanitation amount to USD 8.3 billion, representing 7% of total sector allocable aid in 2009-10. Most of this aid was aimed at achieving the MDG specific targets, namely, reducing by half the percentage of people without sustainable access to safe drinking water and basic sanitation by 2015.

Aid to water and sanitation targeted regions most in need of better access to water and sanitation: Sub-Saharan Africa received 26% of total aid to the sector, and South and Central Asia 21%. The poorest countries received 40% of the total (OECD 2012).

Starting with 2010 flows, it is possible to identify aid for sanitation separately from water supply: of total DAC members' aid to this sector in 2010, water supply activities represented 21%, sanitation 13%, and combined water supply and sanitation activities 44%; the remaining 22% consisted of sector budget support, contributions to funds managed by international organisations, waste management and education activities. While aid to water supply and sanitation has increased in recent years, these contributions still seem insufficient considering the funding needs, according to the OECD DAC (2012).

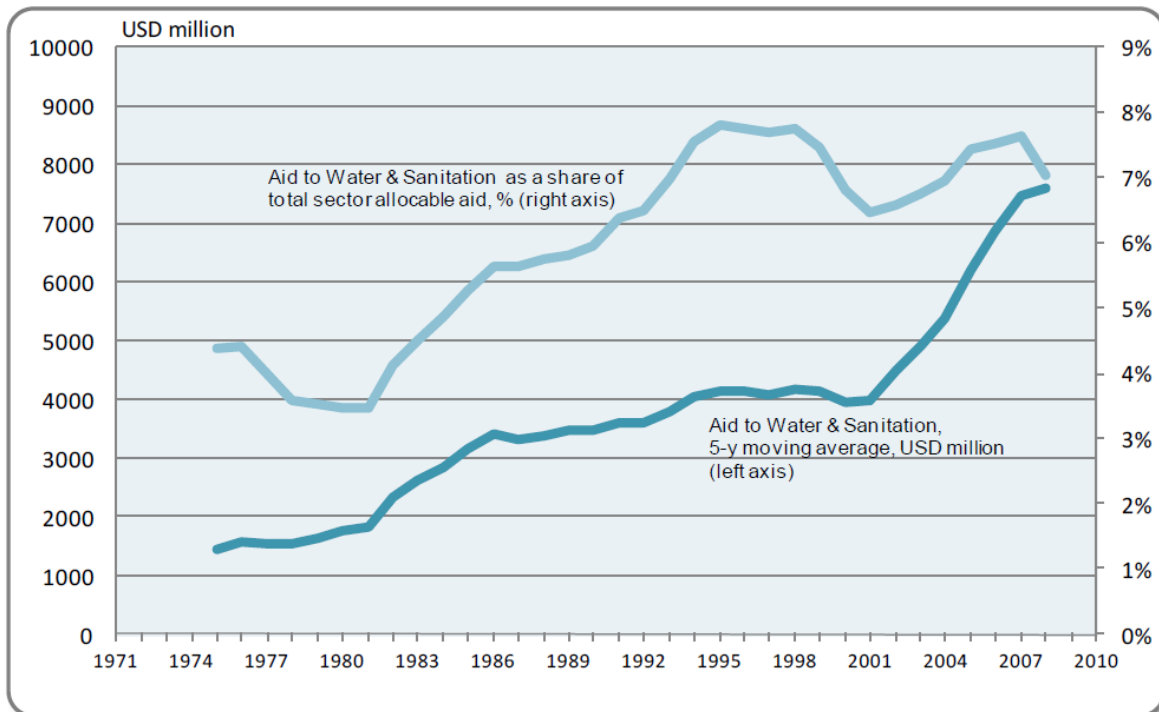


Figure 1. Trends in ODA to water and sanitation (OECD, 2012)
1971-2010, 5-year moving average commitments, constant 2009 prices

MAIN FINDINGS—INTRODUCTION

This set of evaluations provides evidence from a range of country cases. The aim was to offer insight into the impact of water and sanitation programmes supported by the Dutch Government and at the same time to draw lessons of broader relevance for the development community. The evaluations illustrate the effectiveness and impact of water supply, sanitation and hygiene promotion interventions, particularly in poor, rural areas, in five countries.

The types of interventions evaluated show some similarities and some differences. Most interventions were to construct simple rural water supply facilities, such as public taps, boreholes and protected dug wells. A few programmes involved piping water into homes or yards. All the cases studied included education and training components for sanitation and hygiene promotion, and some included construction of improved sanitation facilities (pit latrines, sewage system). The governments, including national, regional and local actors, of the countries play a central role in the execution of the programmes, most of which were carried out in a context of decentralisation. Projects examined here were financed (at least in part) through international development assistance provided either to the government or to non-governmental organisations (NGOs). Most water facilities in the rural communities studied are managed by an organisation of water users from the local area. In Benin, local authorities are responsible and management is subcontracted to private companies. In the case of the programme in Egypt, a local company linked to a national holding company is responsible for the operation of large scale piped water supply and waste water systems.

The following sections outline main findings on: access to clean water, improved sanitation, programme results for the poor and for women and girls, health impacts, sustainability and governance. The last section looks at policy implications. Examples are provided throughout the text and in boxes.



Photo: A woman in rural Tanzania pumps water at a community water point (IOB 2010)

ACCESS TO CLEAN WATER – MAIN FINDINGS

Evaluations show that the use of improved water sources has increased, but programmes still need to do more, especially on the safety and optimal use of drinking water after collection. Water quality tests in programme areas found evidence of faecal contamination (indicated by presence of *E.coli*) of some drinking water at the source. This problem is exacerbated when water is stored in the home, as illustrated with data from Benin in Figure 2. Contamination occurs when people touch water with unclean hands or put it into dirty containers. In Benin, an experiment that provided clean, closed containers for water transport and household storage showed a strong reduction of the presence of *E.coli*.

In all the cases of communal water points that were studied, part of the population continues to use less safe traditional water sources, sometimes also for drinking water. The average quantity of water used from improved water sources is usually above the absolute minimum of 5 litres per person per day for drinking, cleaning of vegetables that are not boiled and basic hygiene. However the WHO/UNICEF Joint Monitoring Programme standard of 20 litres per person each day is still far from being achieved in a substantial number of the programme areas.

The impact studies show that, where there is access to an improved water source, varying proportions of households in the communities studied do not use it

at all, or do not use it during part of the year. The reasons vary. They include long distance to the improved source, particularly in cases of scattered rural households; high number of users per water point causing long queuing time; availability of rain water as an alternative source during the rainy season and decrease in the water output of some improved water sources, particularly during the dry season. For example, in Mozambique, the impact evaluation found that paying for water did not create barriers to access for poor households, but 31% of households in villages where an improved water sources was introduced still did not use it. In this case the continued use of traditional sources is mainly explained by long distances to the improved water source. Aggregate data on the number of water points constructed, their designed yield and the size of the local population may mask such realities at the household level. Investigation of actual household use and storage practices (including possible recontamination) is therefore needed to be sure about programme impact.

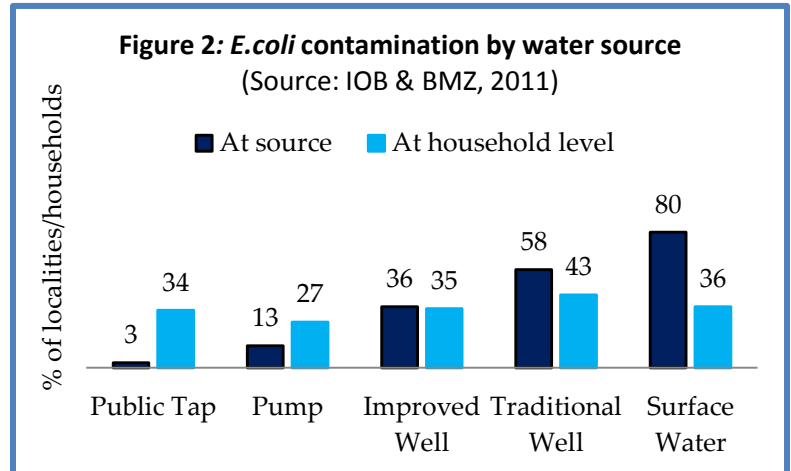


Photo: Construction of a water treatment plant Egypt (IOB, 2011)



Photo: Household water storage in Egypt, where people store water before use due to water pressure problems. Of samples taken from water stored in traditional pots (left) 20% were contaminated with coli form bacteria (IOB, 2010)

Box 2. Working together to bring clean drinking water and basic sanitation to rural homes

The Government of Mozambique, UNICEF and the Netherlands have established a partnership to contribute to the achievement of the MDG on water and sanitation in Mozambique through a programme known as 'The One Million Initiative', which aims to provide water and sanitation to one million rural households in the Manica, Sofala and Tete provinces. Its approach is participatory and demand responsive, with user communities and schools expected to take leadership and responsibility for the maintenance and management of their improved facilities and behavioural change, supported by Government, NGOs and the private sector. The programme implementation strategies are aligned with the national water policy, which places priority on meeting the basic needs of the disadvantaged, on decentralised management and on the participation of users. The programme is an important reference for the National Water Supply and Sanitation Programme (PRONASAR), which is now in its initial phase of implementation. The main water supply technology applied is a borehole fitted with a hand pump. An important component is the engagement of local NGOs to carry out promotion activities in the targeted districts to build demand for improved services, as well as capacity to sustain services and strengthen the supply side for the construction of latrines and maintenance and repair of water points.

The One Million Initiative revised its approach by merging education components with a community-led total sanitation approach. The implementation of water, sanitation and hygiene activities in the target provinces is complemented by the development and strengthening of government capacities at provincial and district level in order to ensure long-term sustainability of the interventions. In a short period of about two years, close to one million people have been provided with access to a functioning improved water point and 433 villages with a population of close to 350,000 have been declared Open Defecation Free (ODF). The impact study showed a large increase in the ownership and use of latrines, particularly for wealthier households (those in the sample with an above average increase in wealth). However, so far, only a few latrines satisfy all conditions of adequate and safe sanitation. The sanitation intervention is responsible for a 3% decline in the prevalence of diarrhoeal diseases. Good progress has been made towards sustainable benefits but Government and NGOs do not yet have the capacity to provide and sustain the required services in the long term and institutional accountability mechanisms at the local level are not yet strong. The policy assumption that communities will be able to meet the costs of major repairs and replacement of water infrastructure is not realistic in the short to medium term.

BASIC SANITATION

The impact of education and training on the construction and use of toilets has in many cases been limited, but there are recent examples of approaches with promising results. Within a few years, the 'Community Approach to Total Sanitation' (CATS), see Box 3, promoted by UNICEF in Mozambique, achieved an increase of almost 14 % in households' ownership of a private latrine and subsequent increased use of latrines in the communities studied. The hygiene of toilets also improved. The sustainability of these achievements will be assessed in a follow-up study.

Another programme for which monitoring reports and external evaluations show promising results is the NGO BRAC's programme in Bangladesh. The approach combines a broad range of activities aimed at awareness, small loans for the building and improvement of toilets for poorer households, subsidies for the poorest and loans and training for local entrepreneurs. The percentage of the population with an (improved) toilet has increased significantly.



Photo: A basic latrine in Mozambique (IOB, 2011)

Perceived affordability for households and fiscal viability for state and local authorities influence progress in sanitation. Poor rural households' willingness to pay for 'improved' latrines is sometimes overestimated. In Benin, for example, the average amount that surveyed households were ready to contribute was only about a third of the cost of such structures. In Mozambique and Tanzania, on the other hand, people are able and willing to build much less costly simple latrines with local materials – but these do not always conform to international standards for a sanitary facility, which have themselves been subject to debate. Further research on the health impacts of such facilities would be useful.

As the MDG data show, developing country governments and their partners must devote more efforts and resources to implement more effective approaches in the rural sanitation sector. As a result of a predominantly technical orientation, government institutions are often not equipped for providing education and training for promotion of appropriate hygiene and sanitation behaviour, undermining effectiveness. Programme components for promotion of sanitation and hygiene are often left to NGOs and funded by donors. Collaboration between water and health authorities remains limited. Developing countries are often reluctant to invest in basic sanitation, particularly if the strategy to be pursued is not capital intensive. Where governments install capital-intensive sewage systems and waste water treatment plants, they may over-design them and/or miscalculate willingness to pay for services. In some cases, such as in Mozambique, however, the government contributes to the effective, low cost CATS approach (Box 3). Yet, overall, governments' capacity to subsidise latrines and sewer connections is limited, and responsible institutions remain weak, endangering sustainability.

Box 3. Community-led solutions: What is CATS?

The 'Community Approach to Total Sanitation' (CATS) builds on experience in Bangladesh with the Community Led Total Sanitation (CLTS) movement based on taking joint decisions to make improvements and aiming at creating communities free of open defecation. The approach confronts communities with information about the impacts of open defecation on health, combined with a system of incentives and awards for those communities that abolish it completely. CLTS/CATS uses participatory techniques to trigger collective change in sanitation practices. The approach requires good facilitation skills in order to capture and use the moment when the entire community is triggered to take action on their sanitation situation. A key 'triggering moment' is the demonstration of the faecal contamination of food.

HEALTH IMPACTS



Photo: Hand washing in Tanzania
(IOB 2011)

The health impact of the water and sanitation interventions evaluated by the five studies was limited in most cases. The full potential of health benefits is realised only when all of these conditions are met:

- drinking water is safe (uncontaminated);
- enough water is available all year round and within a short distance of the household;
- there is large-scale access to, and hygienic use of, toilets; and,
- hands are washed with soap or ash at all critical times (after using toilet, before eating, etc.).

Complete fulfilment of *all* of these mutually reinforcing conditions is rare, limiting health impacts.

HEALTH IMPACTS (continued)

The impact on health is also determined by the situation before the interventions. For instance, the situation in Egypt was relatively good at the start, and the three main interventions – controlling water quality, increasing water pressure, and installing piped sewerage systems – all contributed to a moderate reduction of 9% in diarrhoea prevalence. The most substantial improvement – 26% drop in diarrhoea – was found for communities in Tanzania where conditions were very poor before the introduction of improved water sources. In Mozambique, studies calculated a 3% reduction between 2008 and 2010, attributable to CATS – the only instance, in these studies, of health benefits directly attributable to an awareness-raising and training intervention. The study in Benin could demonstrate no health benefits for adults from the interventions – partly because some people already had a safe water supply, partly because of contamination of water during transport and storage, and partly because of the low proportion of the population in the communities (<10%) using an improved sanitary facility. In Yemen, surveyed households generally reported increased levels of disease, but these increases were less in places with water networks and house connections.



Photo: Hygiene education class in Benin (IOB 2011)

The evaluations suggest that health benefits are constrained by the failure to simultaneously and consistently improve water supply sanitation and hygiene – meeting all of the factors mentioned above. Despite the existence of improved sources, people may be unwilling or unable to get enough water from them all of the time. Water may not be safe enough at the source, or transport and storage may be unhygienic and other hygiene practices may be inadequate, resulting in re-contamination before use. Toilets may be (perceived to be) too expensive for poor households or may not meet basic sanitary requirements, undermining health impacts. These factors explain the disappointingly low impact on health outcomes despite the successful increase in access to water and, for some programmes, to basic sanitation.

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The demonstrated health impacts in these studies are less than impacts indicated by much of the literature in this field (IOB 2012). This difference can partly be explained by the poor rural circumstances in which most of the programmes were executed. Differences may also be explained by the more or less isolated nature of the activities evaluated, with more isolated interventions, comparable to the experiment with closed clean water storage containers in Benin, showing poorer results.



Photo: Water storage experiment in Benin (IOB, 2010)

HELPING THE POOREST

Rural water programmes are broadly beneficial to poor communities. Poverty is widespread in the regions where rural water and sanitation interventions typically occur, so most beneficiaries are poor. The poorest people in the beneficiary communities usually enjoy the benefits of improved water supplies too. But the very poorest and most marginalised communities typically have less access to these programmes and benefit less from them. Especially in Benin and Yemen, households in better-off communities were found to be more likely to benefit from improved water supplies. This may be because these communities are better able to make the local contribution to installation costs that many programmes require from their beneficiaries, and may also be better connected politically, which can be significant in demand-driven programmes.

There is less equity of access in the rural sanitation sector. Latrine construction and sewer connections mostly benefit households or communities that have had more wealth increase or are relatively better off, as surveys showed in Mozambique and Egypt respectively. The programme of BRAC in Bangladesh provides an example of a specific focus on poverty by providing small loans to poorer households and subsidies to the poorest to combat this bias.



Photo: Traditional unimproved water sources in Shinyanga, Tanzania (IOB, 2011)

BENEFICIAL EFFECTS FOR WOMEN AND GIRLS

Improved access to safe water supplies has beneficial effects for women and girls, who enjoy time savings and sometimes a reduced work load as a result. When water must be fetched from distant and sometimes multiple sources, women and girls are normally the ones who bear the burden. There are social and institutional benefits for women, too, when rural water and sanitation programmes stimulate their participation – as in Bangladesh, Mozambique and Tanzania. In Tanzania, for example, about half the members of water user groups are women; in several countries, women also play prominent roles in hygiene and sanitation campaigns.

But time savings and reduced work load only achieve limited benefits in terms of increased income. The time saved is usually devoted to other unpaid work such as collection of firewood or unpaid agricultural labour. Only in Benin did these studies find a substantial

proportion of households (35 %) reporting that women were able to spend more time on income generating activities. Typically, poor households with better access to safe water still face the same severe limits on economic opportunity. More time does not mean more money. The same holds for women and girls in rural communities. There is some impact of water and sanitation programmes in terms of higher attendance at school by girls. In Yemen, a 4% to 8% increase in the proportion of girls enrolled in village schools could be attributed to improved water supplies. In Benin 40 % of children in the sample, and in Tanzania one third of water user groups, said that the time girls spent on study or school attendance had increased because of easier access to safe water supplies.



Photo: Women and children collecting water from a community water point in rural Tanzania (IOB 2011)

SUSTAINABILITY

The full operation of most of the water supply and sanitation infrastructure reviewed has improved over the years and is reasonably well assured in the short term. For example, studies in the five countries found that the percentage of operational water supply facilities had increased with support from the programmes over the years. Eighty to ninety percent of the water supply facilities under review were operational at the time of the studies, some of which were evaluated many years after the water supplies had been installed. The high percentage is explained by varying factors such as management of facilities by motivated community level organisations of water users; strong community leadership; dependence of communities on the water source; the water supply facilities still being new; and rehabilitation of broken facilities by the government with donor assistance.

However, capacity for longer-term maintenance of these systems is insufficient at all levels, even when local management institutions appear well motivated. Weak institutions are the root cause of many failed water and sanitation systems. Technical sustainability depends on institutional sustainability, so institutional maintenance is vitally important. However, in the areas reviewed, support to institutions is typically inadequate. Institutional monitoring is lacking. Capacity of community level and lower level government structures has improved but these still face major capacity constraints. The capacity and sustainability of NGOs in the sector is questionable. Relying on NGOs and external finance (from donors) may dilute slower, but ultimately more sustainable, efforts to build the role and capacity of local government institutions.

Many programmes have tried to strengthen the role of the private sector in the installation and especially the maintenance of rural water and sanitation systems, but with limited success. Often the markets are too small, scattered and sporadic to make such work a viable business proposition. An even bigger challenge is paying for maintenance in the medium to long term, when major parts and sometimes whole systems may need renovation or replacement. Covering the full cost of long term maintenance from user charges is rarely feasible; an element of subsidy will remain necessary for the time being. Governments and funding agencies are often reluctant to confront this reality.

COORDINATION AND GOVERNANCE IN THE WATER AND SANITATION SECTOR

There is increased clarity on the roles and responsibilities of the different actors and their institutions in the water and sanitation sector. Before the 1990s, the state was often the dominant actor in the regulation and execution of policy, often without a coherent policy framework and implementing through a fragmented variety of institutions and projects. Since then, policy frameworks and the roles and responsibilities of different actors, including local governments, private sector and NGOs, have become increasingly clear. But efforts to stimulate information exchange and operational

collaboration between central and local government agencies, NGOs, private sector and users still usually fall short. The evaluation of the Tanzania programme found that it was a good example of a step-by-step approach that helped to build understanding, acceptance and co-ordination of stakeholders' respective roles.

MDG 7 has been a driving force for the monitoring of expanded water supply and basic sanitary facilities (programme outputs). The impact studies, however, indicate a lack of information on the factors, including contextual, that undermine or reinforce benefits and limited use of such information for improving policies and implementation. Limited availability of quality data, and the limited use of such empirical information, are significant constraints on the effectiveness of policy in this sector.



Photo: Testing water quality and gathering data in Benin (IOB, 2011)

IMPLICATIONS FOR POLICY

The evaluations show that progress has been made on access to improved water sources, with beneficial impacts on the basic conditions of people's lives and the work load of women and girls. There has been some progress, too, regarding basic sanitation and hygiene practices and benefits for human health, though outcomes were not as positive as could be hoped due to the failure of programmes to effectively meet all impact criteria simultaneously. Further improvements are both needed and possible. The following are specific lessons.

Policy should make more effective use of existing knowledge about the impacts and effectiveness of rural water supply, sanitation and hygiene interventions – for example, information about the risk of limited impact on health if investments are only made in communal water supply facilities without effectively improving hygiene and sanitary conditions in households. More context-specific knowledge also needs to be built in various fields, such as solutions for affordable basic sanitation in poor rural areas; the upgrading of simple latrines to make them sanitary; marketing of affordable sanitation solutions for poor households and communities through the local private sector; means of disposal, treatment and productive use of human waste; economic use of time savings; up-scaling of successful interventions.

The responsible management of policy for sustainable impact in rural water supply and sanitation requires a **more thorough approach to baseline studies, monitoring, evaluation and overall knowledge management** than has been achieved to date. The programmes reviewed here are not alone in lacking adequate capacity for the effective management and monitoring of policy and its results. There have been too few impact studies like the ones quoted in this paper. Policy and programme design for the sector makes too many poorly tested assumptions about effectiveness and impact.

Needless to say, a clear focus is a prerequisite for effective policy. The programmes reviewed show that **policy effectiveness in this sector is constrained by a lack of clear focus and consistency**. For example, there is uncertainty about the comparative importance in different settings of distinct but potentially overlapping policies – the relief of extreme poverty and promotion of the role of the private sector in basic service provision, for instance. Governments and development agencies may be committed to both policies, diluting the effectiveness of each. One way to enhance clarity and focus is to accept that governments have a central and fundamental role with regard to these basic human needs, and that, through governments, societies must accept a long term responsibility for some subsidisation to the sector.

The effectiveness of both water supply and sanitation programmes can be undermined if they do not include an explicit poverty focus. If poorer people do not benefit in full, health risks may persist for all people in the community. At the same time, **too narrow a focus on one dimension of poverty leads to unrealistic expectations about impact and sustainability**. Poor rural beneficiaries of water and sanitation programmes are still poor in other ways, even if their water is safe, their health is better and women and girls have more time available. If the rest of the economy remains poor and if local and national institutions continue to lack resources, the achievements of water and sanitation efforts are limited, and their sustainability will be questionable. Like other basic social services, they will need long term financial and institutional support. In other



Photo: Water pump operator in Yemen (IOB, 2011)

words, progress is needed towards many MDGs if progress towards water and sanitation targets is to be effective and sustainable.

Despite many references to sustainable development, **policy and programmes are still too focused on the short-term delivery of infrastructure**. More realism is needed about the mid- to long-term necessity of sector support, and there should be more clarity about how the cost of water service delivery is to be funded in the absence of full cost recovery from users, which has proven unrealistic in poor rural settings. There is inadequate recognition of the on-going need for institutional maintenance, in addition to technical maintenance. Greater clarity and realism are needed about the role, capacity and sustainability of NGOs in the sector.

Not enough attention has been given so far to the environmental sustainability of rural water supply programmes, especially in the context of climate change. More environmentally integrated approaches to rural water supply and sanitation are needed, for example in the context of integrated water resource management.

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Evaluation Insights are informal working papers issued by the OECD DAC Network on Development Evaluation. These notes present emerging findings and policy messages from evaluations and share ideas on the policy and practice of development evaluation. This note summarises the findings of a series of impact evaluations of water and sanitation activities. For more information, please contact Rita Tesselaar: rita.tesselaar@minbuza.nl.

Further reading



From infrastructure to sustainable impact: Policy review of the Dutch contribution to drinking water and sanitation

Policy and Operations Evaluation Department (IOB), 2012

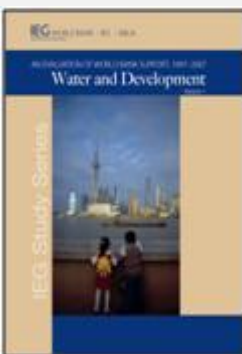
The full policy review upon which this Insights note is based. The study describes how the use of improved water sources has increased substantially, explaining though that this does not guarantee the safety of the drinking water for consumption. Effects of training and education on the building of toilets and their use and on hygiene are often limited, although there are some promising results.



Water and Development: Taking Lessons from Evaluation Summary of Discussions at the Berlin Conference

KfW, Germany, and the Independent Evaluation Group (IEG) of the World Bank Group, 2011

A report on the conference, “Water and Development”, organised by the Evaluation Department of KfW Development Bank and IEG, for practitioners who had recently carried out or were working on evaluations of water-related activities in developing countries with the objective to foster discussions and offer a forum to exchange experiences among evaluators tackling water sector evaluations.



Water and Development: An Evaluation of World Bank Support, 1997-2007

Independent Evaluation Group (IEG) of the World Bank Group, 2010

The amount of available water has been constant for millennia, but over time the planet has added 6 billion people. Water is essential to human life and enterprise, and the increasing strains on available water resources threaten the mission of institutions dedicated to economic development. The ultimate goal is to achieve a sustainable balance between the resources available and the societal requirement for water. In this evaluation the IEG examines all the water-related projects financed by the World Bank between 1997 and 2007.

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