A critical evaluation of Rwanda’s potential to achieve the millennium development goals for clean water and sanitation

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ABSTRACT

In the world-wide Millennium Development Goals initiative, Rwanda promised to halve by 2015 the number of people who lacked access to safe water and improved sanitation in 1990. Progress has been made in access to water, but the target figure will probably not be met. Targets for improved sanitation will be met on the original definition of ‘improved’, though probably not if shared provision is excluded. However, beyond the usual rural/urban divide, the article highlights how the numerical target conceals a serious problem in the capital city, where ‘informal settlements’ have grossly inadequate provision. We argue that the problems are not soluble at the individual level; a whole and unbreakable chain of provision is needed. Centralised provision is also not very feasible in Rwanda, so Government and/or development partners will probably have to work at the level of communities to set up sanitation chains and train communities in servicing them. Solving the problem is essential if the urban poor are to be offered a decent life and to solve the public health problem of contaminated water.

Key words | informal settlements, Millennium Development Goals, Rwanda, safe water, sanitation chains

INTRODUCTION

Rwanda is a small, densely populated country still recovering from the 1994 Genocide against the Tutsi, which destroyed the economy and social order and badly damaged the infrastructure. The wellbeing of the population has improved dramatically, with access to health insurance, reductions in maternal, infant and child mortality and near-universal primary schooling. However, most of its people still live in rural areas – 83 per cent of the households (Census 2012) – over 70 per cent are still dependent on subsistence agriculture, and poverty rates are improving but still high. Rwanda has a stable government and a growing economy but is still substantially aid-dependent; the base for direct taxation is very narrow. Government policies are on the whole pro-poor, its survival strategy hinges on supplying public benefits rather than pleasing powerful minorities (Booth & Golooba-Mutebi 2012) and its stance favours ‘dialogue and consensus’ over political debate (see Abbott et al. 2014a).

The world-wide Millennium Development initiative is an agreement between the countries of the developed and developing world to make a substantial improvement to the lives of the many millions who are in poverty and misery; Rwanda was a signatory and accepts its obligations. The Millennium Development Goals (MDGs) are incorporated in the strategic plans for achieving the country’s future Vision (Ministry of Finance & Economic Planning 2007, 2013) and embody the world’s vision for development; by 2015 poverty, ignorance and want are to be reduced to half the 1990 level across the world. Among the resources to be made accessible are clean water and an acceptable sanitation system. Specifically, Target 7c of MDG 7 is to halve by 2015 the proportion of people who lacked access to safe drinking water and improved sanitation in 1990. For Rwanda, the targets are to raise the percentage of the population with an improved source of drinking water...
from 62 per cent in 1990 to 81 per cent in 2015 and the proportion with access to improved sanitation from 32 per cent to 66 per cent.

Achieving access to clean water will have important consequences for the lives of the poor, improving child and maternal health and reducing the daily burden of fetching water from distant sources. Water and sanitary provision are also public health issues because they affect everyone’s health; over 80 per cent of the diseases that afflict Rwandans are waterborne or linked to the water supply (Toepfer 2004). It is the poorest people who suffer most, however, and particularly their children, who pay the price through illness, distress and thousands of early and preventable deaths (Evans et al. 2009).

**SOURCES OF INFORMATION**

This article is mostly based on two surveys carried out in Rwanda every five years which overlap in the information they present but have their own particular focus.

- The EICV surveys (‘Integrated Living Conditions Survey’ – the acronym is from the French) were carried out in 2000/1 (EICV1 2002), 2005/6 (EICV2 2006) and 2010/11 (EICV13–14, EICV15b 2012). The 2010/11 survey had an achieved sample size of 14,308 households; every member of the selected household over the age of 6 is interviewed. Its focus is on economic activity, economic standing, housing, schooling and employment, which provides a rich set of demographics to be explored. In 2005, the sample was 6,900 households and in 2000, 6,450.
- The Rwanda Demographic and Health Surveys were carried out in 1992, 2000, 2005 and 2010, with an achieved sample size of 12,540 households in 2010/11. One woman aged 15–49 in the household is interviewed, plus one male in alternate households; there are no interviews with children, but adults are asked about them. The prime concern is to collect statistics on health, reproduction and fertility, and data collection is confined to households containing at least one woman between the ages of 15 and 49. In 2005, the sample was nearly 10,300 households, in 2000 nearly 9,700 and in 1992 just over 6,000.

These surveys are referred to throughout this article as RDHS and EICV. The EICV survey is preferred on the whole; it has a larger sample of individual respondents (allowing analysis of smaller areas and sub-groups), includes a wider range of demographics and covers the full range of the population. RDHS excludes older people (though there are admittedly not many of them), and it does not have the same data on poverty, but it started eight years earlier, close to the baseline date for the MDG Goals, and is therefore useful in providing a longer series for prediction.

Both surveys use multi-stage probability sampling. Small areas are randomly selected, and in each the target households are selected from a list which is checked for currency with the local leaders and/or by direct observation. Data are collected face to face by trained interviewers, and response rates are remarkably high – often in the high 90s. Triangulation is provided by the fact that the two surveys generally produce very similar answers to the same or similar questions.

The 2012 Census is now available, but the Census occurs only once every ten years, which limits its utility in a country where the demographic make-up is changing, and it does not distinguish ‘improved’ sanitary provision.

**IMPROVING THE WATER SUPPLY**

Achieving safe water for all at an affordable cost has been a world target since at least 1976, reaffirmed every ten years or so but never achieved. Most recently it has been abandoned and replaced by a target in terms of the ‘proportion’ of people who cannot access clean water by reason of distance or cost (see Langford & Winkler 2013: 9), which has negative consequences:

The downgrading of the water and sanitation targets from a universal goal to a proportionate reduction ... decreases the likelihood that the most marginalised groups and individuals will be targeted in service provision ... Halving the proportion of people without access can be achieved without improving the situation for a single person with a disability, living in a slum or belonging to a marginalised ethnic minority (Langford & Winkler 2013: 12).

In Rwanda, we would want to include remote rural areas among those in danger of being marginalised, because it
obviously involves more effort to provide them with accessible sources of water. However, Rwanda has not gone for a soft target but has promised to make safe water available to over 80 per cent of the population by 2015 and to everyone by 2020.

Despite good progress, the target is unlikely to be met. Using RDHS data (Figure 1) because there is a data point for 1992, we get consistent progress but a 2010/11 figure of only 74 per cent overall, well short of 81 per cent. EICV data for 2010/11 are very similar.

According to the EICV, safe water is most common in Kigali, the capital city, followed by other urban areas, with the lowest access in rural areas; while 86.4 per cent of urban households use safe water, and indeed 28 per cent have water piped to their dwelling, this falls to 72 per cent and 2 per cent in rural areas. Access did not increase in urban areas between 2000/2001 and 2010/11, probably because of failure to match increased provision to increased urbanisation. Between 1992 and 2001, the urban population grew by around 250 per cent and went from 5.5 per cent of the total to 16.9 per cent (Census 2002). There was little percentage growth between 2002 and 2012, but the overall increase in population size meant that absolute numbers grew by between 25 and 30 per cent in both urban and rural areas (Census 2012). Provision has increased in rural areas, but by little enough to suggest under-investment in this area. RDHS data show much the same.

The MDG target includes the expectation that the water source will be within a kilometre of home and take no more than 30 minutes to reach (United Nations Development Programme [UNDP] 2014). The Government has pledged to reduce distance to nearest improved source, and the median time is now just under 9 minutes in urban areas and 16 minutes in rural areas (EICV3a). The comparable times in 2005/6 were 11 minutes and 19 minutes (EICV2). In urban areas, 66 per cent of households are within 15 minutes’ walk of their source of improved drinking water, compared with 41 per cent in rural areas. Those in higher consumption quintiles are more likely to be near an improved supply, and this was also the case in 2005/6. This is likely to be because those in the richest quintile are the most likely to live in urban areas, especially Kigali, and/or to have water piped or delivered to the house. In the most remote rural areas times can sometimes be substantially longer; in research on another topic that we carried out in the Eastern Province (Abbott et al. 2014b) we came across one community where it took four hours daily to fetch their water.

**IMPROVING SANITATION**

The main target here is to halve the proportion of the population lacking access to improved sanitary facilities. The 1992 figure for those with access to improved sanitation is 32 per cent, so the target for 2015 is 66 per cent. The original definition of ‘improved sanitation’ specified that it would be possible to maintain hygiene, and the minimal case was a pit latrine mounted on a solid slab (see e.g. UNDP 2003). Later, the definition was modified by the World Health Organization/United Nations Children’s Fund (WHO/UNICEF) Joint Monitoring Committee to exclude shared facilities, where hygiene was seldom maintained – see WHO/UNICEF (2013) – but the Rwandan Government usually employs the original definition when quoting results. By this original definition around 75 per cent of individuals have access to improved sanitation, whether EICV or RDHS data are used – well in excess of the target (Figure 2). If shared facilities are excluded (Figure 3), the achieved figure falls to 61 per cent, short of the target. Progress has been accelerating since 2006 (EICV3b), mainly in rural areas, where it has increased by 15 per cent in each ten-year period since 1990. According to the 2012 Census the most common provision is the private pit latrine (about 58 per cent of provision in urban areas and nearly 90 per cent in rural ones); less than 5 per cent of urban households and less than 2 per cent of rural ones have flush toilets. Shared pit latrines are more common in urban areas (37%) than in rural ones (7.7%), and the remaining types of provision make only trivial contributions (the highest, ‘going in the bush’ in rural areas, accounts for only one per cent of respondents).

![Figure 1](progress-in-the-provision-of-clean-water-1992-2015-%-of-households-source-1.png)
The improvement between 2005 and 2010 was greater in rural areas, where access has doubled since 1990. Access to unshared ‘improved’ facilities in towns has declined if anything, reflecting the growth of shared facilities in overcrowded informal settlements on the one hand and a failure to fund a sufficient expansion to meet the population expansion on the other. The increase in rural areas is partly due to the ‘villageisation’ programme whereby people are persuaded to live in settlements (which make focus-points for service delivery in, for example, health) rather than on their scattered plots of land; the houses that are built for them typically include latrines. Since 2008, the WHO/UNICEF Joint Monitoring Programme has used a four-step ladder to assess sanitation: no facility, ‘unimproved’, shared facilities that would otherwise count as ‘improved’, and ‘improved’ – see Figure 4 – which reflects the effects of urban growth not matched by investment. In urban areas, the decrease in the percentage of ‘improved’ pit latrines (remembering that the urban population has been growing, so there is no decrease in the actual number) is matched by a growth (in percentage terms) of ‘unimproved’ provision which may have been constructed when people first moved onto unused land to constitute informal settlements, perhaps not long after the Genocide, given that the percentage of the population living in urban areas grew from 5.5 per cent in 1992 to 16.9 per cent in 2002. The percentages in the 2010 ‘urban’ block of the Figure do not quite add up to 100, and this will reflect the growth of flush toilets among the affluent. In rural areas, however, improved facilities have more than doubled, and the growth is matched by percentage decreases in unimproved latrines and open defecation.

The major remaining problem with regard to sanitation is illustrative of how numerical targets can overlook serious but localised problems. A shortfall against target is occurring in towns and particularly in the capital city, in the poorest of the areas which Rwanda often labels ‘informal settlements’ or ‘unplanned settlements’. Unlike similar settlements in surrounding countries, those who live there (or their land-lords) may in fact have registered legal title to the land under Rwanda’s land registration laws of 2005 and 2013 and thus be prepared in principle to invest in improvements, but there is still no security of tenure because the Development Plan for Kigali envisages the replacement of all informal settlements (Joshi et al. 2013). In the poorest settlements, there is no land for extending provision; at the bottom of the scale, town-dwellers live crowded together in settlements which lack most facilities and are unhygienic and unpleasant. In a recent study of two of the worst in Kigali (Tsinda et al. 2013), the pit latrine with or without a slab was the most common sanitation option (91.2%), but if the revised WHO/UNICEF definition is applied the figure for households with improved facilities drops to 18 per cent. The problem is compounded by inadequate provision for maintenance.

Pit latrines with a slab represent improved sanitation in its most basic form, but once the pit is full it no longer provides this service; and the pit must either be covered over, and a new latrine constructed, or the existing pit emptied. … unlike other developing cities such as Kampala, Nairobi and Dar-es-Salaam, Kigali has no clear
strategy for the emptying of pit latrines … and only two per cent of households empty sludge from their pits. (Tsinda et al. 2013; 6949).

In rural areas, the normal solution would be to close the hole and dig another, but in the urban informal settlements there is no more land in which to dig. Open defecation was described as relatively common by informants in the informal settlements, whether because of lack of an appropriate facility or because what was available was grossly unhygienic or even dangerous – the existence of a facility does not guarantee that it will be fit for use or judged by its potential users as fit for use. Settlement leaders described people defecating into bags which are then thrown onto their own or someone else’s roof – though the survey figures suggest that this is actually uncommon overall (Figure 4). However, in the absence of disposal sites, untreated sewage may be deposited on dumpsites or in ditches, drains and open spaces (Rwanda Environmental Management Authority [REMA] 2009). A more systematic approach is obviously needed; it is not sufficient to rely on individual households to clear up their own mess.

**DISCUSSION**

There are clear signs of economic transformation in Rwanda. There is improvement on most social indicators and the gap between the poor and the better off has narrowed, not least in their access to clean water and to hygienic sanitation. This is not the ‘clean water’ of developed countries, of course – safe to drink from the tap – but it is free from insect infestation, cholera and typhoid and safe to drink after boiling. Rwanda has probably hit its targets for access to sanitation, and while it has not hit the ambitious water target, there has been progress.

However, achieving targets is not always the same thing as achieving the underlying goal. In particular, sanitation for the urban poor needs further concerted action, probably by Government in the first instance. The impoverished urban areas have been neglected, particularly in the capital city. Furthermore, access to water does not always mean use of the access point all the time; the poorest cannot afford to pay even modest user charges, and even relatively short distances may be a problem for the elderly and the disabled.

Rwanda’s most frequent approach to change would be ‘sensitisation’, and the Government is very effective at mobilising community spirit through ‘dialogue and consensus’ in public rallies, regular local discussion meetings and ‘clubs’ in schools (see Abbott et al. 2014). More than in most societies, Rwandan governance is good at building communitarian norms or what Ishihara & Pascual (2009) call ‘we-intention’ – a set of normative expectations which takes for granted that a community perspective is shared by all. This has a part to play in areas where, despite WHO judgements about their acceptability, shared facilities are the obvious answer; people have to learn to adopt the shared facilities as their own responsibility and to build facilities for the poorest members of their community. This can be reinforced by close monitoring of the responsibility taken for sanitation – probably by the Community Health Workers who are already active in every village and settlement and have a role in sensitisation about hygiene. However, even these two together are not the whole solution because although individual neglect may exacerbate problems it is not what causes them.

Some people in informal settlements might be able to afford to pay for services or structural improvements, but the rent the poor can pay is not sufficient to cover capital investment and there can be no certainty of tenure because Kigali’s informal settlements are designated for redevelopment by 2025 (Joshi et al. 2013). Beyond this, the current use of pit latrines is not sustainable in densely populated urban areas for lack of physical space and adequate and affordable servicing.

1. Latrines cannot be replaced in the slums because there is little or no unoccupied land on which to install septic tanks (an expensive process) or to dig new pits, and often the water-table lies near the surface, which means that deep pits contaminate the water supply;
2. The pit latrines cannot be emptied by conventional suction hoses because there are few such services and they are too expensive for the poor;
3. Even manual emptying into containers is an expensive process; and
4. There are in any case few safe places to which untreated effluent can be taken.

The Kigali City Plan (Joshi et al. 2013) envisages temporary on-site treatment plants where new construction is
taking place, a temporary sewer-fed plant (pond) for the central part of the city and the construction in the medium term of a centralised permanent site. Pit latrines are to be prohibited in new construction and also, along with septic tanks, where the water table is high or the site is too near to a body of water; they are to be replaced with a more ecologically friendly system which treats the sewage organically and compacts it, increasing the life of the latrines and making it possible to transfer their contents into containers that can be stacked and carried. The City Council is already prepared to subsidise this for the very poor.

Centralised provision may not be the straightforward answer to Rwanda’s urban sanitation problems, however.

... such systems need high investment and most developing cities, including Kigali, lack the financial resources to pay for [them]. ... Because of high maintenance cost and little profit returns, centralized or off-site water and sanitation systems have to be directly cross-subsidized and the chances to ever become financially sustainable are low even in developed countries. ... To transport human waste, networks of sewer pipes [also] consume enormous volumes of water, which is not available in informal settlements (Tsinda et al. 2013: 6950).

Decentralised systems such as composting toilets – which are already being installed experimentally in the city’s schools – do not necessarily require a separate treatment plant and may be the best bet for sustainable containment and recycling of urban waste in impoverished areas (Jha 2003; Tsinda et al. 2013). They take little land – there is no pit to dig – they are separate from the groundwater supply, the composted output can be carted away with relative ease and at relatively low cost in containers rather than needing to be pumped into tankers, and they generate a product which can be employed by the community to fertilise soil or sold to cover the costs of the operation.

CONCLUSIONS

Providing sanitation is not an individual act but the first step in a chain of provision. Sanitation requires (a) collection of waste, (b) somewhere to deposit it, (c) if not already composted at source, processing to remove its harmful qualities and (d) a mechanism for distributing and disposing of the processed product. This kind of chain is what industry and commerce manage well, but action by Government may be needed to establish it in the first place, and because the chain is effective only if unbroken the state may have to regulate the process to ensure the continued existence of all links and their coordination.

Water supply and sanitation illustrate the dilemma which faces many governments in developing countries that are trying to deal with social problems. Because of the low tax base, public money could be used only at the expense of underfunding some other initiative. The immediate problem is the initial investment: the costs of installation are high and therefore no commercial organisation is likely to take a sufficient profit from it to make it commercially viable. The state may have to be not just the regulator in the public interest but the initial primary provider. One solution might be Development Aid and/or International Non-Governmental Organisations, to set up facilities which can become commercially self-sustaining once established. Access to finance and affordable solutions – perhaps using the partnership approach (which worked for extending the stock of classrooms) of communities supplying the labour and Government the materials – may be an alternative way forward. Whatever is adopted, training of local people will be needed, so that they can set up small businesses or cooperatives to fulfil the functions of the sanitation chain at a local level. Research is needed to establish what is acceptable on the ground, would be used by the poor population and could be made commercially attractive to investors and entrepreneurs, and Government would need to be involved in systematic monitoring of the provision and at the level of ‘normative work’ – sensitisation, training and education – to change behaviour where necessary and build on current communitarian attitudes and expectations.

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