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Water point sustainability and the unintended impacts of community management in Malawi

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This paper reports the findings of a mixed methods study of 679 randomly sampled water points in four districts in Malawi. The study a) tested the influence of ten proximate determinants of water point functionality, and b) critically examined the social, economic and political dynamics underlying these factors, especially the community management model. The data shows that the key influences on sustainability are water point type and installation quality (technical factors) and availability of funds, skills, and incidence of theft (management factors). Misuse of funds by water point committees emerges as a particular problem. These results are driven by the way that community management structures interact with socially embedded institutions and power dynamics. The findings challenge the assumptions of efficiency and empowerment that underpin the community management model, and show that in fact it frequently generates conflict and reproduces inequality at community level.

Background

Water point sustainability: a long-running debate

Significant (although uneven) improvements in access to clean water have been achieved in the last 15 years thanks to increased investment (WHO/UNICEF 2014). However, these positive results may not be sustained if water point functionality continues to stagnate (RWSN 2009).

Debates over sustainability have a long history, and a wide range of explanatory factors and frameworks have been suggested. However, few studies attempt to identify the relative importance of, or interactions between, determinants. Additionally, and despite the growing shift in emphasis "from system to service" (Schouten and Moriarty 2003, Lockwood and Smits 2011), the community management model remains dominant in practice in rural areas, with relatively little real questioning of the assumptions of 'efficiency' and 'empowerment' on which it rests. This study therefore sought to identify and test the influence of the main proximate determinants of sustainability, and to examine whether community management operates in practice as it is supposed to in theory. It extends the literature in two ways: 1) scale, with a rigorous methodology and a large dataset; and 2) scope, as it links a technical analysis of 10 proximate determinants with a political economy analysis of the endurance, and side-effects, of the community management model.

Rural water supply in Malawi: performance, finance, and policy

Malawi was selected as the focus of this study because of the availability of a national dataset, the water point mapping database (hereafter 'WP database'), compiled between 2003 and 2005 (WaterAid et al 2005). This provided a starting point for sampling and initial analysis. The database indicated that only 66% of water points were operational in 2005. Performance varied significantly by WP type, and between districts. Although the latest JMP data indicates that 85% of Malawians now enjoy access to safe water (WHO/UNICEF 2014), sector stakeholders are concerned that progress has stagnated since 2007, and that many improved sources do not provide water of adequate quality (GOM 2012).

Government expenditure on WASH increased rapidly between 2006 and 2011, both in absolute and relative terms (GOM 2012). However, only a tiny proportion of the water budget (~1%) is devoted to rural

water supply, and district budget allocations for water are dwarfed by the allocations for other sectors. Accurate data on NGO expenditure is not available, but they are very significant players in the sector. Most NGOs, like the government, focus primarily on new installations or major rehabilitations, and rely on community management to ensure sustainability.

The Government of Malawi's National Water Policy states that water point sustainability will be ensured through community management, which is believed by the Ministry to work very well and to be the key to tackling sustainability (Matamula 2008). However, the roles and responsibilities of communities are not articulated anywhere in the National Water Policy, there are no national guidelines on community management, and virtually no post-construction support is available.

Study design and methods

Research questions and strategy

This study sought to answer two linked questions: 1) what are the main factors contributing to variation in the sustainability of improved public water points in rural Malawi, and how much of an influence does each factor have; and 2) how and why do these factors influence sustainability? To answer the first question, I identified (based on a comprehensive literature review), and then tested, ten proximate determinants of water point sustainability (Table 1). To answer the second question, I used the theory of critical institutionalism (Cleaver 2012) to examine the underlying dynamics influencing water point sustainability.

Table 1. Proximate explanatory variables for water point sustainability	
Design and installation factors	**Post-construction factors**
WPTYPE – Type of technology INSTQUAL – Quality of installation USERS – User numbers AGE – System age	MAINTFREQ – Frequency of maintenance SPARES – Accessibility of spare parts SKILLS – Availability of maintenance and repair skills FUNDS – Availability of funds for maintenance and repair SUPPORT – Availability of external support THEFT – Incidence of theft

Design and sampling

The study employed a cross-sectional mixed methods design using stratified purposive and probability sampling, with a sampling frame based on the WP database of nearly 50,000 water points. The study sought to maximize external validity of the findings through careful sampling and rigorous methods. I collected new primary data on 679 water points and from 276 survey respondents in 24 VDCs (Village Development Committees, i.e. group villages) in 4 districts (two high-functionality and two low-functionality), and combined this with field observations and survey notes, and interviews with 26 key informants at village, district and national level. Primary data was triangulated with secondary data, both quantitative (WP database) and qualitative (blog posts by Engineers Without Borders Fellows), as shown in Table 2.

Districts and TAs were purposively sampled in order to identify two high- and two low-functionality districts, and high- and low-functionality TAs within each. VDCs and water points were randomly sampled in order to minimise bias. Survey respondents were purposively (convenience) sampled based on respondent availability, and interviewees were purposively sampled to generate a cross-section of key stakeholders, including national and local government officials, donors, and NGOs.

Table 2. Data sources for this study		
	Primary	**Secondary**
Quantitative	Surveys: 177 users, 99 managers, 338 surveyed water points, 341 listed water points. Dataset has 955 cases, 266 variables.	2005 WP Database: 49,517 cases, 20 variables.
Qualitative	Survey notes: 177 users, 99 managers, 338 water points. Interviews with 26 respondents: 6 local government, 5 national government, 6 donors, 9 NGOs, 1 area mechanic. Factor ranking exercise: 19 / 26 interviewees.	Blogs: 28 bloggers, 739 posts, spanning Sept 2008 – Feb 2013.

Data collection and analysis

Fieldwork was conducted in 2011 and 2012 (8 weeks in total). Water Point Committee members ('Managers') and Users were surveyed in Chichewa by an experienced local researcher. Each survey took about 45 minutes, and covered 74 questions for Users, and 132 questions for Managers. Shorter surveys were conducted by the author at the other water points in each VDC, working with a local translator. Key informant interviews were conducted in English; 19/26 were recorded and transcribed.

Quantitative data was analysed in SPSS using descriptive statistics and a range of statistical tests. Qualitative data was transcribed and coded in NVivo using both emergent and pre-determined coding schemes, based on the analytical framework for the study.

Findings: proximate explanatory variables for water point sustainability

Each of the ten proximate explanatory variables shown in Table 1 was analysed using both quantitative and qualitative data. Although the initial intention of this study was to generate an easily comparable quantitative measure of each factor's influence, data limitations meant that this was not feasible. Instead, both quantitative and qualitative data were combined to arrive at a judgement of each factor's importance. A summary of the results is outlined below; full results are available at http://etheses.bham.ac.uk/5014/.

Low influence on sustainability: users, age and spares

Regarding users, queuing time is a significant influence on whether people use safe water points; but user numbers per se are not a major influence on functionality.

age, perhaps somewhat surprisingly, was not shown to be, by itself, a major influence on functionality: old but well-made water points were more likely to be working than new but poorly-constructed ones.

Generally, very few spares are held in stock by water point committees (WPCs). Quantitative analysis did not support the claim that access to spares is a problem: physical barriers to access are not very significant, and questions of finance are more important. These findings echo those of McNicholl (2011).

Medium influence on sustainability: maintfreq and support

The findings on preventive maintenance were unequivoval: it is almost never done. This vanishingly low maintfreq is both a cause and a consequence of low skills: if Managers do no maintenance, then when the water point breaks down they have often forgotten how to fix it.

Little support is available to communities. Instead, users rely on ad-hoc arrangements – such as lobbying international NGOs, or politicians during election season – to get major repairs done. WPCs rarely ask District Water Offices for support; and even if they do, it may not be provided. When support is given (from whatever source), it is associated with a real, but small, increase in the likelihood of functionality.

High influence on sustainability: instqual, skills and theft

Installation quality (proxied by the identity of the installer) is clearly significant: for example, only 54% of Government WPs are functional, while the rate for NGOs is almost always much higher, and up to 97%. Overall, NGO water points are more than twice as likely to be functional than water points installed by others. Respondents highlighted the importance of good contractors: "there is high functionality in Mangochi East because the technical part is just very good, the contractor is very good…" and the perils of poor ones: "the private sector has no quality control"; "most of these contractors are indeed crooked"[1].

The skills variable was assessed via several questions about the role of WP committees (WPCs). The study found no statistical relationship between (reported) existence of a WPC and functionality. In fact, most WPCs are essentially defunct: they do not maintain the water point, and they do not collect funds. Few WPC members are capable of undertaking repairs (as one Chair said, "we don't maintain it because we don't know how the borehole works"), and there are insufficient numbers of Area Mechanics.

The third high-influence variable, theft (of parts, not WPC savings), is generally under-addressed in the literature, but emerges as a major influence on sustainability in this study. Theft is relatively common, and frequent in certain locations: it was reported at 15% of all WPs surveyed, with incidence exceeding 50% in 3 of the 24 VDCs, and over 20% in a further 6 VDCs.

Very high influence on sustainability: wptype and funds

The influence of water point type (chi-square value of 31.8, $p<.000$) is unsurprising. The primary data shows that 74% of boreholes are functional, compared to only 27% of taps; this is in line with many previous

authors' observations that boreholes have significantly higher functionality than piped systems, and Afridev pumps are much better than solar pumps or Playpumps. Respondents reported frequent 'coordination' problems with piped systems, including deliberate vandalism to divert water for irrigation, and inter-village conflict over responsibility for repairs.

The most prominent finding from this study was the influence of funds. This variable was assessed using 29 survey questions to ensure that results did not just reflect 'what respondents first reported' or 'what they thought they should say'. Two aspects are particularly worth noting. First, there is an extremely low level of savings among WP committees. Since most respondents report making regular (45%) or occasional (27%) payments to the WPC, in theory most WPCs should have significant amounts saved for maintenance and repairs. However, among 86 Managers who provided data, 24 (28%) did not know how much was in the Maintenance Fund, 19 (22%) said there was nothing, and 8 (9%) said the question was not applicable (i.e. there is no such Fund). Among the 54 Managers who knew how much was held in the Maintenance Fund, the median amount saved was MWK 1150, or about £2.75 at the time the research was conducted. Only eleven Managers reported that enough had been saved to buy a single replacement rod costing MWK 4000 – but in theory, a village of 80 households should be able to save this amount each and every month. There is a moderately large and significant relationship between (self-reported) regularity of payment and functionality ($X2$ (2) = 11.728, P<.005) but data limitations mean this result should be interpreted with care.

Qualitative data also emphasized the significance of funds, which was the most frequently-coded variable by a large margin. The responses highlighted two key findings: 1) contributions are much lower than expected or claimed, and 2) funds are often misappropriated or "eaten" by Managers and Village Heads (VHs): "sometimes [the VH] gets the funds and misuses it. He has the powers and controls the WPC". It is clear that financial management is a very widespread problem, leading to considerable mistrust and conflict.

Findings: underlying dynamics of community management

The empirical findings described in the previous section help to <u>describe</u> the relative influence of different determinants of sustainability. I now seek to <u>explain</u> these findings through examining the social, political and economic dynamics that underlie their operation. In particular, I address two questions: a) to what extent does the operation of community management in practice reflect its potential benefits in theory (i.e. efficiency and empowerment); and b) what explains the differences between theory and practice?

Efficiency and effectiveness?

In theory, community management is both efficient and effective, because it ensures that the community members who rely on the water point – and therefore have strongest motivation to keep it working – have the skills and funds to do the necessary maintenance and repairs. The key mechanism is 'ownership', through which people feel that they have both the responsibility and the power to act. Thus, water point committee members should be best placed to ensure sustainable rural water services, through conducting regular preventive maintenance, making rapid and high-quality repairs in case of breakdown, and collecting and saving funds to pay for repairs as needed. However, in practice, these assumptions do not hold.

Preventive maintenance is almost never done

Respondents frequently explained "they never do preventative maintenance; they only do things to it if it is broken". As one District Water Officer observed: "we train the people but most of them after training they have not touched the borehole". Indeed, the philosophy of 'if it ain't broke, don't fix it' is understandable, since a significant number of boreholes function effectively for years with no maintenance.

Repairs are often slow and sub-standard

Despite training, many WPC members struggled with the technical aspects of their role; they often reported problems with attempted repairs, and many were unable to identify basic spare parts. One respondent spoke for many: "we were trained but we have no skills". Sub-standard repairs are common, especially improvised U-seals made out of old 'slippers' (plastic flipflops), and fixing broken rods by 'tying them with string'. These practices reflect unwillingness or inability to pay, more than physical inaccessibility of spares.

Committees are unable to collect and save funds

Most WPCs are characterised by limited and/or inactive membership, infrequent or non-existent meetings, weak technical skills, and financial management problems. Misuse of funds is frequently reported: "in the

past the treasurer used the money for business". Because users do not trust committees to save funds, the 'just in case' model of financial management has entirely collapsed. Instead, funds are collected on an ad hoc basis when needed for repairs – which can take weeks or months. These challenges are unsurprising in the financial and social environment of rural Malawi, but the clarity with which these findings emerge provides an interesting contrast with much of the practitioner literature (e.g. Harvey and Reed 2004) where misuse of funds is only mentioned tangentially.

Empowerment and equity?

In theory, community management is both equitable and empowering. It should provide a model of democratic, egalitarian social organisation that will empower community members by equipping them with the skills and authority needed to ensure that their water needs are met. Thus, community management should challenge inequality, build social capital, and empower individuals. However, in practice, these assumptions, too, are contradicted by the empirical findings of this study.

Existing unequal village power relations are reinforced

Far from being an arena in which 'lowers' can hold 'uppers' to account, community management often provides a new arena for the reproduction of existing inequalities. Water point committees are frequently used by their members and by village heads as a means of projecting personal power, especially through misuse of funds. Community members explain that they cannot hold their committees to account because "the committee is higher than the community".

Community management breeds conflict, instead of building social capital

Numerous managers report dissatisfaction with their role due to conflict among WPC members, or between them and the wider community. Users and Managers alike observe that: "people refuse to contribute because they don't believe the WPC, they think that they use the cash for their families". Consequently many WPC members "just stopped – they were discouraged because of how the community talk", or "because the community don't listen to them".

Individuals feel disempowered

Both users and WPC members find community management difficult. Users report frequent conflict over money, and voice frustration at their inability to hold WPC members or Village Heads to account. For their part, WPC members report frustration that users do not trust them and "don't listen to them", as well as frustration with the failure of higher authorities to respond when called on. Many WPC members refuse to continue serving: "the committee is there but it is not active because people don't listen to these committee members and they are not respected or recognised as a WPC. So they just stopped doing anything".

Summary

The evidence collected by this study does not support either the 'efficiency' or the 'empowerment' claims of the community management model. On the contrary, the findings suggest that community management is generally characterised by reproduction of existing power imbalances, misuse of funds, increased conflict within communities, and disempowerment both of users and, in some respects, WPC members. Users and Managers alike appear resigned to WPC dysfunctionality; unable to use 'voice' to shape the institution, Users 'exit' by refusing to contribute financially, and Managers 'exit' by ceasing to be active.

Conclusions and implications for policy and practice

The findings presented in this paper both confirm and extend previous critiques of community management (Schouten and Moriarty 2003, Lockwood and Smits 2011), highlighting the fact that the institution of the water point committee, central to community management, is itself unsustainable. Calls for 'Community Management Plus' do not yet sufficiently acknowledge this. Two central lessons emerge.

Professional skills in installation and management are critically important

Technical quality - careful siting, high quality components, and professional construction - is the primary influence on sustainability. This implies that governments and donors should provide incentives for improved technical quality through a) paying for performance and b) auditing/inspecting installations. Community management clearly does not ensure availability of technical skills. Training large numbers of

amateurs WPC 'managers' is time-consuming and expensive, but ineffective, since few will make use of the training. Instead, governments and donors should professionalise water supply.

Community management has damaging side-effects

This study provides strong evidence that community management generally undermines social capital, by eroding trust and increasing conflict. WPC members are expected to fulfill functions that they cannot cope with, and downwards accountability alone does not work; upwards accountability is also needed. Governments and donors currently use community management to abdicate long-term responsibility. The approach should be reconsidered by all stakeholders.

Universalism or participation?

The broader lesson of this study is that approaches to development rooted in a participatory paradigm are not necessarily equitable and empowering. In practice, community management institutions are altered through a process of 'institutional bricolage' (Cleaver 2012), resulting in unintended negative impacts. An alternative 'universalist' logic, based on the right of all citizens to have essential services provided by the state, may offer a more effective and equitable basis for achieving 'everyone, everywhere'.

Acknowledgements

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Note

[1] All quotes are from study respondents. Please contact the author for details of sources, or explore the full study at http://etheses.bham.ac.uk/5014/.

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