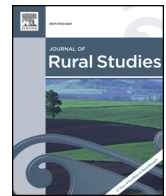




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The social and political construction of latrines in rural Ethiopia

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ABSTRACT

This study seeks to understand the complexity of efforts to improve sanitation practices in the infrastructure-restricted and environmentally vulnerable setting of two rural districts of the Wolaita Zone, South Ethiopia. It seeks to simultaneously address micro-level behavioural and social determinants of sanitation, on the one hand, and political and environmental drivers, on the other hand. We draw on analysis of secondary information and own survey comprising structured interviews and direct observations in 368 households in 11 villages as well as 20 semi-structured interviews with health workers and village leaders. We consecutively examine different sanitation drivers and then attempt to paint a complex picture of sanitation situation in a given context. We found high latrine coverage and use but low functional quality of latrines implying uncertain benefits to human health. We attribute this pattern to relationships between the political construction of latrines (political commitment to sanitation characterized by the command-and-control nature of Ethiopian governance), socially constructed perceptions of symbolic risks and benefits of sanitation, and neglect of sanitation technologies within an environmental context.

1. Introduction

Unhygienic defecation practices significantly increase the risk of diarrhoeal and other infectious diseases. Interwoven with water and hygiene, sanitation represents a major cause of disease around the world (Clasen et al., 2014; Wolf et al., 2014). In 2015, an estimated 2.4 billion of people globally still lacked access to improved toilets and 946 million of them defecated in the open. In Sub-Saharan Africa, the number of people without access to improved sanitation has increased since 1990 due to slow improvements in sanitation coverage and population growth (UNICEF/WHO, 2015). Recent systematic reviews uncovered that sanitation interventions had only a modest impact on latrine coverage and use (Garn et al., 2017) and acknowledged a high dependence of sanitation on diverse influencers that are often context-specific (Novotný et al., 2018a). In order to achieve the Sustainable Development Goal of ensuring all humans have access to adequate sanitation by 2030 (UN, 2015), a further contextually-sensitive understanding of the factors underlying sanitation patterns is necessary.

This article presents a case study from South Ethiopia which seeks to understand the complexities behind efforts to induce and sustain latrine use in an environment characterized by infrastructural restrictions, limited accessibility, and high environmental and socioeconomic vulnerability. We aim to simultaneously address behavioural and social

determinants of sanitation as well as political and environmental drivers. In this way, we reflect on two distinct yet separate perspectives that resonate in recent sanitation research. The first one includes the traditional focus of many public and environmental health researchers on the motivators that drive behavioural changes in sanitation at micro-scale. The second perspective, more characteristic for geographers or anthropologists, examines wider social and political processes and the structural constraints behind 'sanitation poverty' through political-economy and political-ecology approaches and arguments. Our effort to reflect on both these perspectives is explorative in the sense that we consecutively examine different types of determinants influencing observed sanitation pattern and then synthesize the findings. The Integrated Behavioural Model for Water, Sanitation, and Hygiene (IBM-WASH) developed by Dreibelbis et al. (2013), which comprehensively acknowledges multiple dimensions and scales of sanitation drivers, was considered to organize the analytical part of this study. The analysis draws on both secondary information used to outline national and regional context of sanitation politics and own primary data from 11 villages within two districts of the Wolaita Zone, Southern Ethiopia. We collected this data in 2015 through structured interviews in households (N = 368) and semi-structured interviews with health workers and village leaders (N = 20).

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2. Conceptual background

It is acknowledged that successful sanitation change doesn't solely depend on the supply of sanitation infrastructure but requires changes to the political, economic, social, cultural, and environmental underpinnings of sanitation, and a systemic behaviour change at individual, household, and community levels. Previous research identified a number of possible motivators for the adoption of toilets (e.g. prestige and modern lifestyle, privacy, security, or comfort), and various influencers of sanitation outcomes (e.g. wealth, education, occupation, gender relations, physical environment, etc.). This research emphasized various mechanisms of sanitation change operating on different scales such as individual-level psychological processes (Jenkins and Curtis, 2005; Jenkins and Scott, 2007; Gross and Günther, 2014), social norms and social networks that frame individual-level sanitation behaviour to a community-level fabric (Shakya et al., 2015), socio-cultural underpinnings of sanitation (Jewitt, 2011; Coffey et al., 2014; Routray et al., 2015), institutional involvement (Admassie et al., 2009), but also inequalities in general education (Novotný et al., 2018b) or various social and political power relations influencing unequal access to resources and services (O'Reilly and Louis 2014; Bardosh, 2015; O'Reilly et al., 2017).

Given a larger number of potentially important determinants to be considered by sanitation practitioners and researchers, conceptual models play an important role in “taming the complexity” and systematically organizing these influencers (Novotný et al., 2018a, p. 131). A useful synthesis of the behavioural and psychological theories of successful WASH interventions is provided in Mosler (2012) who presents a general behaviour change model, which classifies psychological determinants into five blocks; Risks, Attitudes, Norms, Abilities, and Self-regulation (RANAS). The RANAS model is useful on a practical level as it recognizes that factors in the particular blocks are amenable to different types of interventions and, accordingly, proposes an analytical procedure to design purposeful behavioural WASH interventions. However, the focus of behaviour change models ignores or only indirectly reflects broader contextual influences. This fact was accentuated by O'Reilly and Louis (2014) who provide a simple yet useful conceptualization of conditions required for successful toilet adoption referred to as the ‘toilet tripod’. Their conceptualization stresses the importance of three analytical categories; the multi-scalar political will, proximate social pressure, and political ecology factors. It diverges from earlier frameworks concerned primarily with micro-level behavioural determinants and can be considered as a part of critical sanitation scholarship focusing on wider structural constraints such as power-relations, socio-spatial inequalities, or political ecologies of sanitation (also McFarlane et al., 2014; Bardosh, 2015; O'Reilly et al., 2017; Kotsila and Saravanan, 2017).

This paper was informed by the Integrated Behavioural Model for Water, Sanitation, and Hygiene (IBM-WASH model) by Dreibelbis et al. (2013). It provides a comprehensive classification of WASH determinants which outlines three dimensions of WASH outcomes in terms of the contextual, psychosocial, and technology influences operating at several different levels (Table 1). The consideration of community and societal/structural levels together with habitual, individual, and household levels signifies an integration of the toilet tripod arguments emphasizing influences of a broader socio-political context with behavioural models focused primarily on individual and household levels. The IBM-WASH model can thus be useful in our effort to reflect both of the two distinct perspectives of in sanitation research in our case study. The psychosocial dimension of the IBM-WASH model mainly contains factors that are amenable to interventions from the RANAS model. In addition, the IBM-WASH model incorporates contextual factors that, although typically cannot be manipulated by interventions, are no less important to understand because they can interact with psychosocial and technology factors and significantly influence sanitation outcomes. However, the comprehensiveness of the IBM-WASH model is both a

strength and a limitation. The IBM-WASH model is helpful as an organizational framework but it does not express potential interactions between particular factors or their causal links to different WASH outcomes. In this study, it was used to organize our survey instrument and to structure the presentation of results in this article.

The remainder of this article is organized as follows. In the ensuing section, we describe data and methods used in this study. We then attempt to put our case study into a broader political context of the Ethiopian sanitation strategy and its implementation. Subsequently, we address the technological dimension of sanitation in the surveyed communities. Later, we examine the role of contextual factors that operate at the village-, household-, and individual-level. Next, we consecutively analyse different aspects of the psychosocial dimension of sanitation by exploring perceived advantages, disadvantages, or motivations for particular steps in the sanitation process, perceived social norms around the unacceptability of open defecation (OD) and latrine use, and identified sanctions, the role of sanitation and hygiene knowledge, and the perception of health risks related to sanitation. Finally, we discuss our findings and attempt to integrate them to outline the salient features of the sanitation situation in the analysed region.

3. Data and methods

With the exception of the following section, which is based on secondary information used to describe national and regional political context of sanitation, this study utilizes data collected during September and October of 2015 in 11 rural kebeles (the smallest administrative units in Ethiopia) of the Kindo-Koysha and Diguna Fango woredas (districts) in the Wolaita Zone, Southern Nations, Nationalities, and Peoples Region, Ethiopia. The paper uses the same data set as in our previous study by Novotný et al. (2017) which, however, focused on more specific and different research question. The research site was predominantly rural and considerably restricted in terms of infrastructure, limited in accessibility, and environmentally and socioeconomically vulnerable. The basic characterisation of the research site can be found in Appendix A.

The selection of kebeles sought to reflect the diversity of local environment.. We firstly divided the kebeles in each district into three subgroups based on prior information on their accessibility and elevation (these two parameters were related) and access to protected drinking water and then determined the sample of 11 kebeles randomly from the subgroups. The allocation of our sample to the subgroups was not strictly proportional because the available data on population distribution was imperfect.

We performed structured interviews and direct observations in 368 households (31–39 per kebele) with the help of five experienced enumerators knowledgeable of local context (one female and four males). The interviews were administered in the local language, Wolaita. The enumerators were speaking both English and local language and they were trained specifically for the purposes of this survey. A random walk method was used to sample individual households within selected villages with the aim to cover the spatial organization of each village. Google satellite maps and sketch maps developed with the help of locals were used to specify random walk instructions to enumerators. When available, the head of household was interviewed. Otherwise, another adult member of the household was interviewed. Our structured interviews consisted of 100 items consisting predominantly of closed-ended questions or statements and a few open-ended questions (86 items). The last part of our survey instrument contained a predefined form for records from direct observations of sanitation facilities and their surroundings that were undertaken to assess the availability of latrines and the basic parameters of their functionality (14 items). The survey instrument was firstly developed in English and each question was then translated to local language and repeatedly discussed with the enumerators both before and after testing the survey instrument in one non-selected village. The basic descriptive statistics for the sample can

Table 1
Integrated Behavioural Model for Water, Sanitation, and Hygiene (IBM-WASH model).
Source: Dreibeilbis et al. (2013, p. 6)

Levels	Contextual factors	Psychosocial factors	Technology factors
Societal/Structural	Policy and regulations, climate and geography	Leadership/advocacy, cultural identity	Manufacturing, financing, and distribution of the product; current and past national policies and promotion of products
Community	Access to markets, access to resources, built and physical environment	Shared values, collective efficacy, social integration, stigma	Location, access, availability, individual vs. collective ownership/access, and maintenance of the product
Interpersonal/ Household	Roles and responsibilities, household structure, division of labour, available space	Injunctive norms, descriptive norms, aspirations, shame, nurture	Sharing of access to product, modelling/demonstration of use of product
Individual	Wealth, age, education, gender, livelihoods/employment	Self-efficacy, knowledge, disgust, perceived threat	Perceived cost, value, convenience, and other strengths and weaknesses of the product
Habitual	Favourable environment for habit formation, opportunity for and barriers to repetition of behaviour	Existing water and sanitation habits, outcome expectations	Ease/Effectiveness of routine use of product

be found in [Appendix B](#).

Additionally to the household survey, we conducted 20 semi-structured interviews with health extension workers (HEWs) and kebele leaders of surveyed kebeles. In one case, this interview had a form of group discussion with seven representatives of local groups including a member of village administration, a school teacher, two members of a local women's group, a natural leader, a member of a local water association, and a youth group representative. In another case, a school principal was interviewed instead of local kebele leader. The semi-structured interviews primarily focused on village-level issues such as main problems and priorities, institutional aspects of sanitation, formal and semi-formal sanctions for not adopting toilets and their use in practice, availability of sanitation infrastructure and services, health and WASH policies within a broader context.

Our research received formal approval from the Ethiopian authorities and was approved by the institutional ethical committee of Charles University (approval number 2015/32). All participants and informants participated in the study voluntarily, providing free and informed oral consent while being assured of anonymity and confidentiality. A collaborating NGO People in Need played a consulting role with respect to the design of our survey. They helped to determine the districts and organize our research in Ethiopia with no involvement in data analysis and interpretation.

4. National and regional political context of sanitation

The first Ethiopian campaign for universal sanitation started in 2003 in the Southern Nations, Nationalities, and Peoples Region. This campaign initially focused on individual households, spreading the message that it is obligatory for each household to have access to a latrine. Subsequent efforts to make sanitation campaigns more inclusive through community engagement were undertaken. In particular, the Community-Led Total Sanitation and Hygiene (CLTSH) campaign, an Ethiopian adaptation of the Community-Led Total Sanitation (CLTS; see e.g. www.communityledtotalsanitation.org), has been the primary means to promote hygiene and environmental sanitation since 2011 which was emphasised in major national strategic documents (MoH, 2011; FDRE, 2013).

A key platform for delivering public health services in rural Ethiopia has been the Health Extension Program introduced in 2004, which progressively evolved into the recently launched Health Sector Transformation Plan (MoH, 2015). It encompasses a dense network of salaried positions for more than 38,000 locally recruited females trained as HEWs assigned to individual kebeles. They deliver promotive and preventive services in four health care areas: family health, disease prevention and control, hygiene and environmental sanitation, and health education and communication (MoH, 2007). From 2010–2011 a network of volunteers, referred to as the model family households (as a part of Health Development Army), also facilitated the spread of

essential public health messages within individual neighbourhoods (FDRE, 2013).

The CLTSH campaign was implemented through the Health Extension Program and coordinated by the Ministry of Health in collaboration with other stakeholders, particularly UNICEF and the Global Sanitation Fund (e.g. UNICEF, 2016). The political environment supporting mass implementation of CLTSH contributed to significant reduction of OD in Ethiopia from the estimated 92% in 1990 to 29% in 2015 (34% in rural areas), which is one of the fastest reductions worldwide. However, this has typically been achieved by means of low quality sanitation facilities. Of the 71% of people with access to sanitation facilities only 28% had access to improved sanitation facilities (UNICEF/WHO, 2015). A recent study which evaluated the implementation and impacts of the CLTSH program supported by UNICEF and Global Sanitation Fund in 2012–2015 revealed that implementation is commonly inadequate in terms of quality and the program does not improve latrine sanitation levels enough to sustain positive sanitation and hygiene behaviours (UNICEF, 2016).

As previously stated, the Southern Nations, Nationalities, and Peoples Region, where the research site of this case study is situated, was the first Ethiopian region where a sanitation program was initiated already since 2003 and it gradually developed similarities with CLTS (Peal et al., 2010). Eventually, the program inspired the formation of the national hygiene and sanitation strategy introduced in 2011. The program reportedly helped increase the region's sanitation coverage from 17% to 80% between 2003 and 2007 (WSP, 2007; Terefe and Welle, 2008). Due to the political commitment of the Regional Health Bureau (WSP, 2007), the program was considered a success. Described as a low-cost, no-subsidy intervention, the goal was to mobilize communities and persuade people to build rudimentary pit latrines from local materials. The introduction of more durable subsidized sanitation products was planned for a later phase (Terefe and Welle, 2008, p. 8), but never materialized, at least in the areas targeted by our survey. Although presented as a community-driven initiative, Mehta and Bongartz (2009) noted that efforts were commonly incited through lectures highlighting the problems connected with OD and the fundamental message that people needed to build a latrine, accompanied by the threat of disciplinary sanctions if this obligation was not met. Local mobilisation, self-analysis and community facilitation were often omitted.

Ethiopia's political system is known for its traditionally centralised, vertically stratified organization. Dominant party and state administration structures are deeply intertwined. State representatives at all levels have strong authority and discretionary power. As such, the *woreda* and kebele system of local administration enables firm control of citizens that extends to the household level (e.g. Vaughan and Tronvoll, 2003; Bekele et al., 2016). Noteworthy features of the centralisation of Ethiopian governance are the implementation of Ethiopian health and sanitation policies. While the command-and-control

system of bureaucratic governance can facilitate the rapid transfer of government strategies and priorities into local practice, it comes with the risk of passive and mechanistic implementation of government directives. State agents may prioritize short-term objectives and neglect qualitative aspects of implemented policies that would increase the long-term sustainability of outcomes (WaterAid, 2016). Although presented as apolitical, the Health Extension Program certainly contains politics within itself and represents a powerful instrument to exercise patronage and control over population (Maes et al., 2015a). This is not contradictory but intertwined and complementary to the delivery of health services and material resources for improving health. At the same time, it is legitimated and reinforced by purposely spreading development narratives that can also distract attention from structural problems and alternative voices (Maes et al., 2015b).

5. Availability, functional quality, and use of toilets in surveyed villages

Nearly 90% of households in our sample had a private latrine, while all observed toilets were simple pit latrines located outside of houses. Sharing of latrines between households was uncommon. At 55%, approximately half of the latrines had a solid slab and were not shared between households so these facilities met the WHO/UNICEF definition of an improved sanitation facility. Latrines were constructed from local materials (Fig. 1 provides some examples of typical sanitation facilities) and the construction was mostly undertaken by householders themselves or with help from community members. Only around a third of sanitation facilities ensured some privacy. Of the households with latrines, 75% did not have any form of handwashing facilities and only a minor share of them had a handwashing facility with water and soap or

ash. Water scarcity was undoubtedly a factor behind the latter observation, though 60% of respondents stated that they wash their hands at home.

No commercial dealers or external supplies of sanitation infrastructure were available in the surveyed villages according to the HEWs and village leaders. Importantly, we realized that our respondents solely consider local materials and local manpower as options for the construction of their toilets. Due to construction materials, weather conditions, and pit capacity, latrines were of limited durability. When a pit becomes full after a few years, it is not emptied. Instead, a new pit latrine is dug elsewhere, explaining why more than 90% of respondents from households with a latrine stated that their present latrine is not their first. In 79% of cases, the first latrine was adopted five or more years ago. Those who adopted latrines early were not significantly more likely to have improved latrines than those who constructed their first latrine more recently.

Based on direct observations, 5% of the latrines were classified as obviously unused. Ninety-five percent of respondents from households with a latrine (85% of the entire sample) stated that they consistently use their latrine for defecation during the day and at night, and in rainy and dry periods. By contrast, just 8% of respondents admitted that they predominantly defecate in the open during at least one of the four aforementioned time periods. We didn't find any significant differences in self-reported defecation practices between female and male respondents in male-headed households (that means when accounted for the lower latrine ownership rate revealed for female-headed households which will be reported in the next section). It is known that the OD rates tend to be under-estimated when based on self-reports. Here, 8% of the latrines of those who reported that they predominantly defecate in their own latrine appeared unused and 13% of those without a latrine



Fig. 1. Examples of typical sanitation facilities. A – Pit latrine ensuring some privacy, apparent footpath, solid slab, no cover; B – Collapsed latrine; C – Pit latrine with water and ash available for handwashing.

claimed that they always defecate in their own latrine. Despite this kind of social bias and the generally poor quality of toilets, our findings indicated that the utilization of available latrines was relatively high and consistent. This claim was supported by interviews with HEWs and village leaders. Their estimates of OD rates roughly corresponded to what we found based on the household survey.

6. Contextual factors at village, household, and individual level

Socioeconomic and environmental vulnerability further exacerbated by the exceptional 2015 El Niño drought was a major contextual feature of the surveyed communities. Food shortages were clearly perceived as both the most challenging problem and the main health risk by an overwhelming majority of respondents. At the same time, 63% of respondents reported that their socioeconomic situation had worsened over the past two years, while the deterioration was in the 70% of cases attributed to environmental factors. In this context, it is no surprise that defecation in the open or in unimproved latrines was considered as a relatively low risk and that related problems, such as diarrhoeal diseases, were not among the main issues reported by the local people (see Section 7.4). These broader contextual features undoubtedly impacted the demand for hygienic toilets. In particular, they influenced psychosocial determinants, implying that sanitation change becomes a matter of socially constructed perceptions of risks and benefits rather than actually recognized health threats (discussed in the following section).

Another contextual factor influencing sanitation was the remoteness of a village (Table 2). Interviews with HEWs and village leaders revealed that less exposure to Health Extension Program activities due to a shortage of HEWs in less accessible villages is one potential cause. In addition, characteristics of the local physical environment such as soil erosion, difficult terrain (e.g. swamp areas, stony ground), and lack of natural material together with its rapid destruction by termites were reported as other context-related barriers to the construction, maintenance, and upgrade of latrines.

As revealed in interviews, CLTSH campaigns and regular household checks were undertaken as a form of organized pressure to eliminate OD. In two-thirds of the surveyed communities, formal or semi-formal sanctions were reported. They included fines of 50 or 100 Ethiopian Birr (100 Birr was around 4.5 USD; equal to 18% of the median household monthly income in our sample), in-kind sanctions, denunciations at community gatherings, or one-day arrests. We were informed that sanctions were not often issued during the year of our survey but their possibility still reinforced latrine coverage. The use of negative, formally or semi-formally established sanctions can generally be seen as a local reflection of the broader context of Ethiopian political governance.

The second column in Table 3 examines statistical relationships between the selected household- and individual-level contextual variables and improved latrine ownership. It shows that female-headed households had significantly lower probability of having an improved latrine. Lack of manpower for digging pits and constructing improved

Table 2

Latrine coverage and improved latrine coverage rates by village-level accessibility.

	N	Latrine coverage (%)	Share of improved latrines (%)
Good accessibility – villages located at the main road to district towns	104	95	62
Medium accessibility – low- or mid-land villages not far from the main road	130	89	59
Difficult accessibility – high-land villages, inaccessible by car at least seasonally	133	84	45

latrines was a more frequently reported constraint by respondents from these subgroups of families. In particular, we noted that female-headed households which accounted for 19% of the sample represent a specifically disadvantaged subgroup. A statistically significant positive relationship was identified for household income but this relationship vanished when per capita household income was considered. Also other parameters of households' socioeconomic situation were not found significant. Neither the access to nor the quality of water was associated with improved latrine ownership. On average, the time needed to collect water corresponded to 51 min in rain periods (SD = 112) and 113 min (SD = 153) in dry periods. Also due to the water scarcity, all sanitation facilities were dry pit latrines and water was rarely used for maintenance. In the context, water does not appear to be a factor influencing improved latrine ownership.

The third and fourth columns of Table 3 analyses the correlates of incidence of self-reported diarrhoea measured at household level using a recall period of one month (the incidence of diarrhoea corresponded to 22%) and of self-rated health measured on the five point Likert scale with the fifth category denoting very good health (the mean was 3.81 with an SD of 1.16). These two parameters were additionally analyzed as independent variables in the regression analyses presented in Table 3 because they may be considered as examples of secondary outcomes in a logic model of sanitation (and WASH in general), whereas improved latrine ownership represent a primary outcome in the presumed causal logic chain (e.g. Novotný et al., 2018a). Ownership of an improved latrine was included as a predictor in these models, but any statistically significant relationship between ownership of an improved latrine, the diarrhoea incidence, and one's self-rated health was revealed. Interestingly, the use of water from an unprotected water source was associated with higher incidences of diarrhoea ($p < 0.05$) and lower self-rated health ($p < 0.01$). These findings suggest that water quality represents a more important factor with respect to diarrhoea incidence and self-rated health than improved latrine ownership in the present context.

7. Psychosocial factors

7.1. Motivations, perceived advantages, and disadvantages

Using open questions and subsequently classifying responses into their broader types, we attempted to ascertain the main types of individual-level motivations for the adoption of latrines and their subsequent improvement (Table 4). Similarly, we elicited the main types of reasons for satisfaction and dissatisfaction with current defecation practices (Table 5), perceived disadvantages of OD (Table 6), and advantages of private latrines (Table 7). The most frequently reported reason for the initial adoption of latrines was a command expressed as “someone told me I had to”. It suggests that the adoption of latrines was largely driven by coercive institutional pressures. Similar to the use of formal sanctions, it resembles some of the earlier critiques on the misuse of the CLTS approach (see Galvin, 2015; Engel and Susilo, 2014; Bardosh, 2015). The fact that the adoption and use of toilets has been driven by command-and-control rather than ‘facilitated ignition’ questions the potential for further improvements in functional quality of sanitation facilities (also see Novotný et al., 2017).

Although the composition of response types in Tables 4–7 is not identical, some commonalities can be observed. Overall, health-related reasons, motivations, and advantages or disadvantages were the most common response types. It indicates a widespread awareness of potential links between latrine adoption and human health. However, it can be assumed that the emphasis on health-related reasons and motivations was socially constructed rather than based on an experienced causal relationship between latrine adoption and health that is generally difficult to trace (e.g. Schmidt, 2014). This assumption is supported by a comparatively lower representation of health-related reasons among the reasons for dissatisfaction with current sanitation

Table 3
Relationships between selected household- and individual-level characteristics and improved latrine ownership, diarrhoea incidence, and self-rated health.

	Ownership of improved latrine	Diarrhoea incidence	Self-rated health (5-point scale, 5 = very good)
	B (Standard Error)	B (Standard Error)	B (Standard Error)
Age of respondent	0.004 (0.011)	−0.026 (0.014)	−0.010 (0.006)
If respondent is male (binary)	−0.155 (0.268)	0.021 (0.322)	−0.019 (0.167)
Household size	0.106 (0.063)	0.042 (0.073)	−0.112 (0.037)**
If the household is female headed (binary)	−0.840 (0.345)*	0.016 (0.396)	−0.414 (0.197)*
If the respondent is illiterate (binary)	0.006 (0.273)	−0.005 (0.328)	−0.365 (0.168)*
If the house is traditional (binary)	−0.261 (0.264)	0.044 (0.325)	−0.221 (0.159)
Log of household income	1.039 (0.607)	−0.905 (0.743)	1.992 (0.393)**
Livestock ownership (in tropical livestock units)	−0.038 (0.072)	−0.058 (0.098)	−0.009 (0.048)
Ownership of land (in hectares)	−0.054 (0.205)	−0.538 (0.341)	0.054 (0.128)
If household uses water from an unprotected source (binary)	−0.370 (0.367)	0.948 (0.426)*	−0.688 (0.220)**
Log of time to collect water (average of dry and rainy seasons)	0.280 (0.450)	0.314 (0.533)	0.853 (0.268)**
Ownership of improved latrine	–	−0.303 (0.290)	−0.045 (0.145)
Pseudo R ² (Nagelkerke)	0.171	0.132	0.289

Notes: Controlled for village-level fixed effects. Significant at the *95% level, **99% level. Ownership of improved latrines and diarrhoea incidences modelled using binary logistic regression and self-rated health modelled using ordinal regression with a complementary log-log link function.

practices (Table 5). Dissatisfaction should reflect material drawbacks of sanitation facilities rather than symbolic risks constructed through persuasive interventions. This is consistent with the observation of a significantly lower share of improved latrines in the subgroup of those dissatisfied with their current sanitation practices and, in particular, the subgroup of those who attributed their dissatisfaction to health-related reasons.

Privacy was often reported among the perceived advantages of private latrines, motivations for their improvement, and reasons for dissatisfaction with current sanitation practices. Privacy was reported comparatively less frequently in respect to the perceived disadvantages of OD and reasons for the initial adoption of latrines. These observations suggest that privacy is a more important factor for sustaining latrine use and upgrading latrines than for the initial shift from OD practices. Correspondingly, those who emphasized privacy in their responses had on average higher probability of better functioning latrines (as measured by the shares of improved latrines reported in Tables 4–7). By contrast, safety and status or prestige in regards to motivations for latrine adoption, and embarrassment, status and prestige in regards to advantages of private latrine and disadvantages of OD were associated with significantly lower rates of improved latrines.

The findings imply that the composition of drivers differ between particular stages of the sanitation process. This is also supported by the last column of Table 4 which shows that the subgroups of respondents who reported the same type of response with respect to reasons for latrine adoption and improvement were only partly overlapping.

Table 4
Reasons and motivations for adopting the first latrine and making subsequent latrine improvements.

	A - Reasons for latrine adoption		B - Reasons for latrine improvement		Overlap in the sets of respondents reporting A and B
	% of total	Share of improved latrines (currently)	% of total	Share of improved latrines (currently)	Calculated as: (A∩B)/min (A; B)
I had to	48%	0.54	–	–	–
Health	36%	0.55	74%	0.61	0.61
Safety	17%	0.39*	24%	0.56	0.39
Privacy	16%	0.58	58%	0.64	0.69
Comfort	14%	0.45	36%	0.60	0.70
Status or prestige	13%	0.29**	16%	0.49	0.37
Dissatisfied with previous latrine	–	–	21%	0.63	–
Total	N = 330	0.53	N = 268	0.59	–

Notes: Significant at the *95% level, **99% level; determined by robust tests of means equality.

Table 5
Reasons for satisfaction and dissatisfaction with current defecation practices.

Related to:	Reasons for satisfaction (of those satisfied)		Reasons for dissatisfaction (of those dissatisfied)	
	% of total	Share of improved latrines (currently)	% of total	Share of improved latrines (currently)
Health	84%	0.61	18%	0.06**
Privacy	57%	0.62	64%	0.28*
Cleanliness	45%	0.64	24%	0.21
Smell	55%	0.58	13%	0.15
Comfort	25%	0.52	21%	0.05**
Safety	–	–	41%	0.24
Condition of latrine	13%	0.65	52%	0.33**
Total	N = 260	0.60	N = 100	0.22

Notes: Significant at the *95% level, **99% level; determined by robust tests of means equality.

7.2. Social influences

Seventy-one percent of respondents indicated that they believe most people in the village outside of their households defecate in a latrine (descriptive norm) and 92% stated that other people definitely should defecate in a latrine (injunctive norm). Similarly, most respondents (86%) strongly agreed with claims that families who use their own

Table 6
Perceived disadvantages of open defecation.

	% of total	Share of improved latrines (currently)
Can affect health	85%	0.52**
Attracts flies	84%	0.52*
Smell	53%	0.56**
Lack of privacy	21%	0.54
Other people come to use it	13%	0.25**
Affects groundwater	12%	0.58
Safety (can be dangerous)	5%	0.35
Total	N = 367	0.49

Notes: Significant at the *95% level, **99% level; determined by robust tests of means equality.

Table 7
Perceived advantages of using a private latrine.

	% of total	Share of improved latrines (currently)
Good for health	62%	0.50
Privacy	42%	0.55*
Avoid contaminating environment	38%	0.51
Convenience	30%	0.51
Avoid sharing with others	29%	0.52
Avoid embarrassment	29%	0.38**
Norm (every household must have a latrine)	18%	0.49
Easy to keep clean	18%	0.51
Reduce medical expenses	12%	0.28**
Prestige or status	10%	0.19**
Total	N = 367	0.49

Notes: Significant at the *95% level, **99% level; determined by robust tests of means equality.

Table 8
Social interactions and improved latrine ownership.

Respondent claims:	% of sample	Improved latrine ownership
Person with whom I discuss important matters always uses a latrine	87%	0.53**
Person who I trust the most always uses a latrine	83%	0.53**
Members of the most proximate household always use a latrine	79%	0.54**
Members of the second most proximate household always use a latrine	79%	0.53**
Total	N = 368	0.49

Notes: Significant at the *95% level, **99% level; determined by robust tests of means equality.

latrine are more respected, that people in their village think their family uses a latrine regularly (76%), and that people in their village think they should use a latrine regularly (76%). The perceptions were undoubtedly influenced by the implementation of CLTSH campaigns and follow up activities including the previously mentioned formal and semi-formal sanctions. However, as demonstrated in Table 8, informal social networks and interactions were also instrumental in reinforcing the perceived social norms around sanitation that were, in turn, significantly associated with the improved latrine ownership.

7.3. Sanitation and hygiene awareness

Four-fifths of respondents indicated that they consider HEWs among the three most reliable sources of sanitation information followed by health centres (17%), government representatives (10%), community

Table 9
Relationships between the knowledge of hygiene and sanitation messages and latrine ownership.

	% of sample	Average number of hygiene and sanitation messages remembered*
No latrine	11%	2.18
Unimproved latrine	40%	3.27
Improved latrine	48%	3.91
Total	N = 366	3.46

Note: *Differences in means are statistically significant according to robust tests of means equality at the 99% level.

meetings (8%), and schools or NGOs (around 5% each). Respondents were able to recall up to eight relevant messages with the average respondent recalling 3.46 messages. Most often, they recalled messages on the importance of latrine use (75%), handwashing (69%), food handling (63%), garbage disposal (42%), and water storage (31%). Importantly, the knowledge of hygiene and sanitation messages was positive in relation to latrine ownership and quality (Table 9). Similar relationships were confirmed between diarrhoea prevention awareness and improved latrine coverage (Table 10).

7.4. Perception of health risks

As noted above, we identified a good awareness of potential links between latrine adoption and health. At the same time, however, we anticipated that the perceived importance of latrines for human health may be socially constructed rather than determined by respondents' own experience and realistic assessments of factual benefits. This assumption is further supported by results reported in Table 11 that compares perceived health risks related to inadequate sanitation practices (in italics) with the perceptions of alternative health risks relevant to the epidemiological context of our study. It shows that defecation in the open or usage of an unimproved latrine (similarly as handwashing before eating) was seen as a minor health risk compared to other potential causes of health problems such as the shortages of food, infection from insects, and health risks associated with drinking contaminated water. In addition, the third column of Table 11 uncovers that the subgroup of those with the highest perception of sanitation health risks revealed the lowest improved latrine coverage rate. Both these findings support the argument about the socially constructed perception of latrine importance.

8. Discussion

The sanitation pattern identified in this study was characterized by a high rate of sanitation coverage (90%) and consistent use of sanitation facilities but their low functional quality. This pattern resembles what has been documented by other studies from Ethiopia (e.g. O'Loughlin

Table 10
Relationship between diarrhoea prevention awareness and improved latrine ownership.

		% of sample	Improved latrine ownership*
Diarrhoea prevention awareness	No awareness	28%	0.37
	Some awareness	47%	0.51
	Good awareness	25%	0.60
Total		N = 365	0.49

Note: *Statistically significant differences in means of particular subgroups at the 99% level were confirmed by robust tests of means equality.

Table 11

Comparison of perceived health risks related to different causes of health problems and relationships to improved latrine ownership.

Expected causes of acute health problems	Identified as one of the two most likely causes of health problems to occur in the following year (% of respondents)	Improved latrine ownership for particular subgroups
Shortage of food	71%	0.57**
Infection from insects or animals	46%	0.48
Drinking contaminated water	39%	0.40**
Eating contaminated/bad food	25%	0.49
<i>Defecation in the open or usage of unimproved latrines</i>	8%	0.28*
Not washing hands before eating	4%	0.77*
Total	N = 347	0.49

Notes: Significant at the *95% level, **99% level; determined by robust tests of equality of means. Of the six predefined alternatives of different causes of acute health problems listed in the table, respondents were asked to select the two they considered most likely to occur in their family in the following year.

et al., 2006; Ashebir et al., 2013; Tyndale-Biscoe et al., 2013; Beyene et al., 2015; UNICEF, 2016; Crocker et al., 2016; Crocker et al., 2017; USAID, 2015; Seyoum and Graham, 2016; Adank et al., 2016). We therefore assume the following points may be relevant to sanitation in Ethiopia beyond the regions analysed in this case study.

The health benefits of latrine adoption and use are diminished if sanitation infrastructure is poor, particularly if widespread hand washing practices are also not employed (e.g. Carter, 2017). Accordingly, in this cross-sectional study, improved latrine ownership was not associated with fewer incidences of diarrhoea or higher self-rated health. The observed sanitation pattern generally implies uncertain health benefits, although it is possible that other health parameters such as child growth may be more impacted by access to toilets (Pickering et al., 2015; Cumming and Cairncross, 2016; Dearden et al., 2017).

Unlike improved latrine ownership, we confirmed a significant statistical relationship between the use of water from protected water sources and lower incidences of diarrhoea and higher self-rated health. This may imply a more consequential role of the access to protected drinking water for human health in the present context. However, it is also true that the health effects of access to protected drinking water are arguably easier to trace at household level than those of sanitation, which is known to be a community endeavour.

Although water is often considered a consequential driver of latrine coverage and use, we did not detect any such relationship in this study. Due to the high level of water scarcity, dry toilets are the only viable option for the present geographical context. It supports the argument that lack of water is not a fundamental challenge for attaining high latrine coverage rates (Fry et al., 2008). Water stress thus puts an additional burden on the technological side of sanitation in rural Ethiopia and makes conventional water-intensive technologies unfeasible. Environmental factors are also interrelated with the psychosocial drivers of sanitation. The environmental vulnerability of the local communities in the analysed regions closely tied to their socioeconomic dependence on environment emerged as a major contextual feature that shapes risk perceptions and determines genuine priorities of local people.

A multi-scalar political commitment to sanitation has been a key enabler behind substantial increases in latrine coverage rates in Ethiopia. The Health Extension Program has become an effective platform for delivering simple community based services in resource-limited settings. We found that HEWs are clearly regarded as the most important source of sanitation and hygiene information and that exposure to their activities influenced sanitation outcomes. Differences in the capacity of HEWs were inversely related to geographical accessibility at village level. Physical remoteness represents a structural barrier to sanitation due to inequalities in human and political capital (e.g. O'Reilly et al., 2017).

Significantly worse sanitation outcomes were uncovered for female-headed households. A lack of manpower to construct and maintain latrines is one possible explanation. However, the gender-related

disparity can also be understood in a broader context of structural inequalities related to polygamy practices and biased customary laws in Ethiopia (e.g. Getachew Assefa, 2012; Kumar and Quisumbing, 2013). Although we didn't exactly determine which of the surveyed female-headed households were those from polygamous unions, local informants estimated that it is around the two-thirds of female-headed households in the surveyed villages. The worse sanitation environment of female-headed households could thus be seen as the result of marginalization being the defining aspect of what McFarlane et al. (2014) referred to as 'sanitation poverty'. The female-headed households didn't differ significantly from the rest of our sample in land ownership, housing quality, or income and livestock ownership when considered on a per capita basis. However, the heads of female-headed households were significantly more often illiterate, had lower sanitation and hygiene awareness, revealed a weaker perception of social norms around the unacceptability of OD, and those in their social networks were reportedly less consistent with respect to the ownership and usage of latrines. These results underscore the psychosocial and educational basis of the gendered disparity in sanitation outcomes rather than explanations connected with unequal access to material resources and wealth.

Nearly half of our respondents reported that they adopted their first latrine because 'they were told to do it'. This response was more frequent than any other reported reason in our sample. In addition, formal and semi-formal sanctions have been used to prevent OD and reinforce latrine coverage. These findings reflect the command-and-control nature of a sanitation approach that diverges from the principles of CLTS in various regards. The style of implementation of sanitation interventions resembled some of the features that are typical for the system of bureaucratic governance in Ethiopia. The top-down system enables effective prioritisation and rapid implementation of program activities (such as CLTHS). However, this system may be better suited for ensuring short term goals but insufficient for sustaining a long term systemic behaviour change (WaterAid, 2016), for inducing a genuine demand for hygienic toilets that would subsequently lead to upward shifts in the sanitation ladder, and for addressing structural causes and inequalities undermining health equity.

Despite the generally low quality of latrines, 72% of respondents reported satisfaction with their current defecation practices and, at 68%, the level of satisfaction was still high in the subgroup of those with unimproved latrines. In households without latrines, just 8% of respondents were satisfied with their defecation practices. Two notable observations can be drawn from these additional results. First, levels of satisfaction uncovered for our sample seem to be quite high. Seymour and Hughes (2014) report lower satisfaction rates for most of the studies in their systematic review. Second, our findings suggest that mere ownership of a pit latrine determined the satisfaction with defecation practices in our sample, largely independent to the functionality of the latrine. It can apparently have adverse effects on sustainability and future sanitation safety.

The descriptive itemization of particular types of reasons and motivations behind individual-level sanitation behaviour provided in this paper sheds further light on these matters. We revealed that potential effects on human health were the most commonly reported motivations for various aspects of the sanitation process. Intuitively, such a widespread focus on health-related reasons doesn't correspond to the fact that people can hardly trace cause-and-effect links between latrine use and their health from their experience in the context of the present study. It also contrasts with our observation that inadequate sanitation was only seen as a minor health risk compared to other risks relevant to a given epidemiological context. Related to the abovementioned finding of high levels of satisfaction with current defecation practices, the prominence of health-related motivations for latrine adoption and use implies that perceived latrine importance has, to a considerable extent, been driven by symbolic, socially constructed beliefs rather than realistic assessments of material risks and benefits.

Some previous literature suggests that impacts on health are often not a major motivation for the adoption of latrines or their main perceived advantage (e.g. Jenkins and Curtis, 2005; Jenkins and Scott, 2007; Coffey et al., 2014). However, the referred studies focused on sanitation in Benin, Ghana, or India, while other evidence from Ethiopia also detected health benefits among the most often reported motivations (O'Loughlin et al., 2006; Debesay et al., 2015; Aiemojy et al., 2017). By contrast, motivation such as prestige emphasized by Jenkins and Curtis (2005) in their study from Benin was not found similarly important for rural Ethiopia by our study or other papers (O'Loughlin et al., 2006; Aiemojy et al., 2017), further reminding us of the importance of context. This may be due to cultural differences between countries (e.g. O'Loughlin et al., 2006) as well as the nature of sanitation politics in Ethiopia.

The arguments above imply that the perceived importance of latrines was largely socially constructed and based on the perception of symbolic risks and advantages rather than on assessments of realistic (material) risks and benefits by an individual. In our previous paper based on the same data set (Novotný et al., 2017) we further elaborated on how the processes of social construction are shaped by the perception of social norms around sanitation. A sanitation campaign's capacity to socially construct the perception of symbolic risks and the power of social influences (social norms and networks) to reinforce this perception can be regarded as another core feature behind the high latrine coverage revealed in this study. We believe that the conceptual distinction between the symbolic and realistic risks is of more general relevance. Although the focus on symbolic risks and benefits and their social construction may be effective for eliminating OD and attaining high latrine coverage within a relatively short period of time, its instrumental ability with respect to climbing the sanitation ladder is questionable. The neglect of realistic (material) advantages and disadvantages may actually hinder actual improvement of sanitation safety in situations where persuasive/normative techniques are used as a standalone sanitation approach.

Appendices

A. Descriptive characterisation of environmental conditions

Parameter	Characterisation
Location of research site	Kindo-Koysha and Diguna Fango woredas (districts) in the Wolaita Zone, Southern Nations, Nationalities, and Peoples Region, Ethiopia. Research sites were situated between 37°35'30"–38°07'11"E and 06°47'08"–07°04'33"N.
Physical-geographical conditions	Elevation was between 1200 and 2200 meters above sea level. Villages were sampled from three agro-ecological categories of low-land, mid-land, and high-land villages (as in classification obtained at district offices). Land topography varied accordingly from flat to quite hilly sloping lands.

9. Conclusion

Our case study demonstrated the complexities surrounding efforts to improve rural sanitation in rural South Ethiopia within conditions of infrastructural constraints, geographical and social remoteness, and high environmental and socioeconomic vulnerability. The sanitation pattern revealed in this study resembles other literature from rural Ethiopia and is characterized by high latrine coverage but low quality of latrines, bringing to question the potential impacts of sanitation on health. We explained the sanitation situation as an assemblage of the following main underlying features: (1) Political construction of latrine ownership determined by political commitment to sanitation and coercive pressures related to the command-and-control nature of Ethiopian governance. (2) Social construction of latrine ownership determined by the construction of symbolic risks and benefits reinforced by social networks. (3) Neglect of the technological dimension of sanitation and non-existent supply of sanitation products and services.

At first glance, the three blocks of factors identified in this study resemble the toilet tripod model proposed by O'Reilly and Louis (2014), who described sanitation in rural villages of West Bengal and Himachal Pradesh in India on the basis of multi-scalar political will, proximate social pressure, and political-ecology factors. In our study, however, proximate social pressure was more interwoven with political pressures which may, arguably, reflect differences in socio-political contexts of India and Ethiopia. Although helpful and inspiring, the toilet tripod model also deflates the role of individual-level behavioural processes and factors. Important structural features related to socio-spatial inequalities and socio-political marginalisation constrain and shape the social and individual parameters of sanitation behaviour as well as the attempts to manipulate this behaviour through sanitation interventions. An integration rather than discursive separation of the critical research into sanitation poverty from research on psychosocial drivers of behaviour change represents a key challenge for future sanitation research.

Declaration of interests

None.

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Water	Average time needed to collect drinking water (including waiting time) for households in the sample was 51 min in rain periods (SD = 112) and 113 min (SD = 153) in dry periods. Share of households using unprotected drinking water in both dry and rain period was 30%.
Agriculture	All villages in the sample were highly dependent on rain-fed small-scale mixed subsistence farming (crop production complemented by livestock husbandry). Main agricultural crops were maize, haricot bean, tef, bread wheat. Agro-climatic conditions considerably depended on elevation. In a large share of households livestock was kept indoor.

B. Descriptive demographic and socioeconomic statistics of the sample

Variables	Statistics
Age of respondents (SD)	40 years (13)
Female respondents	64%
Female-headed households	19%
Household size (SD)	5.99 (2.06)
Average number of children under 5 years (SD)	0.73 (0.75)
Number of elderly above 50 years (SD)	0.41 (0.69)
Families with disabled persons	2%
Illiterate respondents	58%
Illiterate household heads	46%
Protestant religion/Orthodox religion	87%/12%
Farming as primary source of livelihood	96%
Household monthly income (calculated based on both in cash and in kind income) in Ethiopian Birr (SD)	647 (506)
Household land ownership in hectares (SD)	0.81 (0.68)
Household livestock ownership – number of oxen, bulls, and cows (SD)	2.43 (1.80)
Livestock ownership in Tropical Livestock Units (large cattle 0.8; smaller cattle 0.6; sheep and goats 0.1; donkeys 0.4; hens and chickens 0.01)	3.01 (2.07)
Households living in traditional house	53%

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