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Factors influencing sanitation conditions in developing countries: insights from Ethiopia and Cambodia

Faktory ovlivňující sanitační podmínky v rozvojových zemích: zjištění z Etiopie a Kambodži

Doctoral thesis

Supervisor: Prof. RNDr. Josef Novotný, Ph.D

Prague, 2024

Declaration

I declare that I have written this thesis independently and that I have cited all sources of information and literature used. Neither the entire work nor any part of it has been used to obtain the same or a similar academic title.

Prohlášení

Prohlašuji, že jsem disertační práci zpracovala samostatně a že jsem uvedla všechny použité informační zdroje a literaturu. Tato disertace ani její podstatná část nebyla předložena k získání žádného jiného akademického titulu.

V Mníšku, 17.5.2024

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PROHLÁŠENÍ O AUTORSTVÍ

Jako zástupce spoluautorů prohlašuji, že Helena Humňalová, MSc. se podílela na níže uvedených publikacích:

- 1) HUMŇALOVÁ, H. (2016). Latrine coverage and associated factors among rural communities in Cambodia. Case study from the Kampong Chnang Province. *Evaluační teorie a praxe* 4(2):35-39.

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List of Abreviation

CLTS	Community Led Total Sanitation
GDP	Gross Domestic Product
HEP	Health Extension Programme
HEW	Health Extension Worker
HDI	Human Development Index
IBM	WASH Integrated behavioural Model for Water Sanitation and Hygiene
JMP	Joint Monitoring Programme
MDG	Millenium Development Goals
OD	Open defecation
RANAS	Risks, Attitudes, Norms, Abilities and Self-regulation
SDG	Sustainable Development Goals
UN	United Nation
UNDP	United Development Programme
UNICEF	United Nations International Children's Emergency Fund
WASH	Water Sanitation and Hygiene
WHO	World Health Organisation

Abstract

Hygienic sanitation – the safe disposal and management of human excreta – is central to public health and has multiple non-health benefits. While its importance is recognised in global and national strategies, there remains a significant gap in achieving the sanitation targets set out in the Sustainable Development Goals. This thesis aims to investigate and understand the sanitation situation and its determinants in rural Ethiopia and Cambodia, with some attention to India for comparison. It includes the introductory text and four published academic articles. The research undertaken in this PhD project included the analysis of field-level data previously collected in rural Cambodia, participation in the design proposal, fieldwork, analysis and presentation of findings from research conducted in rural Ethiopia, and a comparative analysis of sanitation policies implemented in Ethiopia and India. The mix of research areas and designs enabled the study to address drivers of sanitation that operate at multiple levels - from the level of individual choices and behaviours to the level of communities and national policies. The research findings revealed an important role for contextual variations in the physical and social environment, including the negative effects of remoteness (both physical accessibility and institutional remoteness). The findings also highlighted the multifaceted role of policy. Sustained political support is crucial to facilitate sanitation change, and should include steps beyond a focus on reducing open defecation to address other aspects of the sanitation chain. However, we also observed instances of sanitation policy being misused to command and control the population at the grassroots level in Ethiopia. The research also contributed to a new understanding of the role of perceived social norms in sanitation change, among other findings related to the behavioural antecedents of sanitation. While confirming the importance of perceived social norms, the study showed that enforcing compliance with the new norm of unacceptability of open defecation can lead to negative outcomes and undermine the sustainability of sanitation change.

Key words

Behaviour; Cambodia; Community Total Led Sanitation; Ethiopia; Latrines; Open defecation; Sanitation; Social norms

Abstrakt

Hygienická sanitace, tzn. bezpečné zacházení s lidskými exkrementy, je jedním z ústředních témat problematiky veřejného zdraví a má i řadu dalších ne-zdravotních přínosů. Ačkoliv je toto téma reflektováno v globálních a národních strategiích, sanitační cíle stanovené v rámci strategie Cílů udržitelného rozvoje nejsou naplňovány. Tato disertační práce zkoumá problematiku sanitačních situací a faktory, které ji ovlivňují ve venkovské Etiopii a Kambodži, s určitým srovnáním s Indií. Disertace se skládá z tohoto úvodního textu a čtyř publikovaných odborných článků. Výzkum provedený pro tento disertační projekt zahrnoval analýzu dříve získaných terénních dat z Kambodži, spolupráci na designu, provedení terénního výzkumu, analýzu dat a prezentaci poznatků z výzkumu v Etiopii a provedení komparativní studie sanitačních politik a strategií v Etiopii a Indií. Zahrnutí různých oblastí výzkumu a výzkumných postupů umožnilo postihnout faktory podmiňující sanitační podmínky na různých úrovních, od úrovně individuálního chování jednotlivců, k úrovni komunit a národních politik. Výsledky potvrzují důležitost kontextuálních odlišností ve specifických fyzického i sociálního prostředí, včetně negativního vlivu odlehlosti (jak v geografickém, tak institucionálním smyslu). Demonstrován byl také význam politických aspektů problematiky. Politická vůle a podpora je důležitým faktorem pro nastartování proměny sanitačních poměrů. Je ovšem třeba, aby tato podpora byla dlouhodobá a nesměřovala pouze na první krok dané změny (prvotní zavádění záchodů), ale i na další články procesu bezpečné sanitace. Provedený výzkum nicméně detekoval i zneužití sanitační politiky pro direktivní řízení a kontrolu nad obyvatelstvem na lokální úrovni v Etiopii. Výzkum také přispěl k novému pochopení role vnímaných sociálních norem, mezi dalšími aspekty behaviorálních podmíněností sanitačního chování. Doložil sice klíčovou roli vnímaných norem, ale také demonstroval, že vynucování normy sociální neakceptace nepoužívání záchodů může být kontraproduktivní a negativně ovlivňovat udržitelnost dosažené sanitační změny.

Klíčová slova

Chování; Etiopie; Kambodža; komunitou vedené přístupy k celkové sanitaci (CLTS); sanitace; sociální normy; venkovní defekace; záchody

1 Introduction

Hygienic sanitation prevents the transmission of pathogens, including those causing diarrheal diseases, which are still a major contributor to the global burden of disease (Wolf et al. 2023; Prüss-Ustün 2019) and the second leading cause of mortality among children under five (WHO 2017). Unsafe sanitation also contributes to child malnutrition, reduced resistance to infection and, over time, impaired physical and cognitive growth and development, as well as school readiness and performance (Sclar et al. 2017; WHO & UNICEF 2015). Moreover, there is growing understanding that lack of access to improved sanitation impacts on school attendance, psychological stress, mental and social well-being, and increases women's vulnerability, further exacerbating poverty (Scarl et al. 2018; WHO & UNICEF 2022; House & Cavill 2015). Safe sanitation, related to improved hygiene and access to water, has become indisputable pillar of global public health and has been recognised as a global development priority.

The sixth Sustainable Development Goal (SDG) includes a target to end open defecation (OD) and secure access to adequate and equitable sanitation for all by 2030. In spite of invested efforts, world is not on track to achieve the SDGs targets and sanitation is one of the most challenging features of the SDGs (Moyer & Hedden 2020; WHO & UNICEF 2022). The sanitation sector has struggled to provide sustainable and scalable services as well as to ensure that available services and infrastructures are appropriately utilized. Improving sanitation requires complex interventions that can reach also the most vulnerable populations and build institutional capacities to monitor and maintain quality and usage of services (Pickering et al. 2019). Sanitation is known to be highly context-dependent (Novotný et al. 2018; Winter et al. 2018), and interventions are effective when they are tailor-made to various environmental, social, and political contexts and settings. Moreover, there is a question of whether sustainable improvement of sanitation conditions can be achieved by specific intervention alone, i.e., without broader socioeconomic change.

To measure global access to sanitation, the WHO/UNICEF Joint Monitoring Program (JMP) has defined a service ladder where “safely managed” and “basic” services are the ones that hygienically separate human excreta from human contact. The shares of population with access to such sanitation services are considered as the global indicators for sanitation improvement under SDGs 6.2. In 2022, it was estimated that globally 3.5 billion people lacked access to improved sanitation facilities. Of them, 419 million people were estimated to still defecate in the open. Ninety percent of people defecating in the open live in rural areas. Safely managed sanitation coverage has risen by 10%, from 36% to 46% in rural areas between 2000 and 2022 (WHO & UNICEF 2022). Despite significant efforts invested in enhancing sanitation conditions across various countries, the situation is not improving very rapidly, particularly in rural areas.

The recognition of sanitation as a global priority has led to wider and deeper research on the subject. The available research often focuses on various aspects of sanitation interventions, but research conducted in non-interventional settings has been also common. The former examines specific types of sanitation interventions and, depending on the purpose, can be categorised into impact evaluations, process evaluations or cost-benefit and cost-effectiveness studies, just to mention a few common types. Non-interventional studies based on primary data often focus on

patterns of sanitation conditions and behaviours and understanding the factors that influence them. Another common type of non-interventional studies focuses on sanitation technologies, either from a technical or social perspective. The latter often examine the potential for their adoption, plans and preferences regarding the adoption (including willingness to pay), sustained uses and factors influencing these behavioural measures. In addition, other sanitation research uses secondary data for larger-scale analyses of patterns in sanitation conditions and their comparative analysis, or for analyses of sanitation policies.

Based on literature as well as my experience and findings from two rural areas in Cambodia and Ethiopia, sanitation change, including behavioural change in sanitation infrastructure, depends on the intertwining of local demand, supply of adequate infrastructure, political economic context, structural inequalities and poverty, institutional support, and factors related to physical environment. In each of these domains, various influencing factors, often context-specific, are reported in literature. For example, the demand and use are typically understood through examining objective constraints of households related to income and wealth, water accessibility, etc., and subjective psychosocial factors such as perception of social norms around sanitation, risk perception, knowledge, perceived behavioural control etc. Planning sanitation interventions requires consideration of the complex set of potentially relevant drivers in order to provide the right accessible, affordable, and locally suitable and acceptable sanitation technology options, and engaging the state and communities to ensure political and social support (Devine 2009; Kar and Chambers 2008; Black and Fawcett 2008; Drangert and Bahadar 2011). Overlooking any of these aspects can lead to the failure and/or unsustainability of sanitation programmes, leaving people without adequate sanitation as a basic human right.

The research conducted for this dissertation has focused on some of the complexities around inadequate sanitation in so called developing countries or Global South. The general objective has been to contribute to understanding of some of the factors underlying sanitation in rural areas of Cambodia, Ethiopia, and partly, India. The research aims at examining and explaining sanitation conditions based on primary field research in Cambodia and Ethiopia and comparative analysis of sanitation policies implemented in Ethiopia and India. While it is not possible to address all of the domains of sanitation drivers in a single research project, the thesis (composed of four research papers and this introductory text) concerns with multiple of them such as the psychosocial (behavioural) factors and mechanisms such as influence of social norms, broader socio-political and ecological context as well as specific sanitation policies, and, in part, sanitation technologies.

In what follows, I present the rationale and objectives of my research in more detail. I then situate sanitation within global development strategies, briefly present the countries covered by my research and their sanitation policies and approaches. The fifth chapter focuses on the selected theoretical and/or conceptual approaches that have influenced my dissertation. I then discuss the methods used in my research. Part 7 provides an overview of the published papers that form the main body of this dissertation, briefly outlining the main research questions and summarising their main findings. The complete version of the published articles can be found in the appendix. The final part of my thesis provides some concluding remarks.

2 The rationale and objectives of the doctoral thesis

The sanitation situation, practices and related development interventions have been at the centre of my interest since my MSc degree in Anthropology. In 2012, I conducted applied research in Cambodia, as a baseline study for a project implemented by the organisation People in Need (Humňalová 2012). At that time, sanitation was a Cinderella among other development issues such as education, access to water, improving health, livelihoods, etc.

My interest in sanitation evolved into my PhD proposal with initially broader aims seeking answers to questions such as: Does different context matter for sanitation behaviour and its change? If so, how does it matter? What are the determinants of demand for improved sanitation and how do these determinants vary across settings? These efforts to study contextual specifics and influencing factors underpinned the general aim to investigate and understand the process of sanitation change in developing countries.

During the course of my PhD, my personal situation changed. I interrupted my studies for several years due to maternity leave. In the meantime, there has been a dynamic development in my research field. With the inclusion of sanitation targets into the Sustainable Development Goals (SDGs) launched in 2015, the topic has received much more attention over the years. Knowledge about sanitation and hygiene behaviour has deepened considerably. As there has been an increase in the primary research on sanitation and studies that synthesise the evidence also emerged, particularly regarding the focus on the impacts of sanitation interventions. The evidence suggests that sanitation interventions are often not successful or effective (Garn et al. 2017; Freeman et al. 2017). The fascination with behavioural sanitation interventions in the sanitation and development sector more generally, which peaked when I started my PhD, has gradually faded. Prioritising behaviour change tactics (holds for both Cambodia and Ethiopia) without ensuring access and affordability of sanitation infrastructure leads to problematic outcomes, as does the earlier one-sided emphasis on hardware-only solutions.

Initially, Cambodia and Ethiopia were chosen as the focus countries for my PhD research. The criteria for the selection were several. I wanted to cover distinct contexts (socio-economic, geographical), countries with high rate of open defecation in rural areas, and with different national sanitation strategies. An important factor was collaboration with the NGO People in Need in both of the countries that made the research organizationally feasible. Due to mainly practical constraints, my primary data collection during my PhD eventually focused primarily on Ethiopia. However, I was also able to utilize the previously collected data from Cambodia in the initial phase of my PhD study for one of the publications.

Research in Ethiopia was a collaborative work as a part of the project led by my supervisor supported from the Czech Science Foundation. Although it was initially planned to focus on both Cambodia and Ethiopia, due to changes in the focus of People in Need in Cambodia and organizational issues, the project eventually concerned with the primary research in Ethiopia and India. I was mostly engaged in the Ethiopian component that forms a core of this dissertation. Although I was also involved in a field survey in India, the data has neither been used for the research paper nor for this dissertation. In addition, the most recent article in the dissertation collection compares sanitation policies between Ethiopia and India (I thus also

included a brief overview of sanitation policies in India to this introduction), while I was primarily responsible for an Ethiopian part of the comparative study.

The main objective of my dissertation is to investigate the factors that influence sanitation change from prevalent open defecation towards the consistent use of hygienic sanitation facilities with the primary focus on Ethiopia and a secondary focus on Cambodia.

Four more specific research questions, which I attempted to answer in the four published articles that form the core of my doctoral thesis are as follows.

1. What are the individual and household level determinants of latrine adoption in rural Cambodia?
2. What are the determinants of sustained latrine use in the infrastructure-constrained context of rural southern Ethiopia?
3. How do perceived social norms around sanitation affect sanitation outcomes in rural Ethiopia?
4. What are the national sanitation policies and strategies of Ethiopia compared to India and how do they influence sanitation conditions?

The contribution of my research is that it helped to better understand factors and some of the mechanisms underlying sanitation conditions in specific contexts. Understanding choices made by rural Cambodians and Ethiopians regarding latrine construction and use as well as infrastructural and other constraints that restrict these choices provides valuable and original insights from both academic and practical point of view. In my opinion, the lack of such understanding is one of the reasons behind the clearly inadequate progress in achieving Target 6.2 of the SDGs.

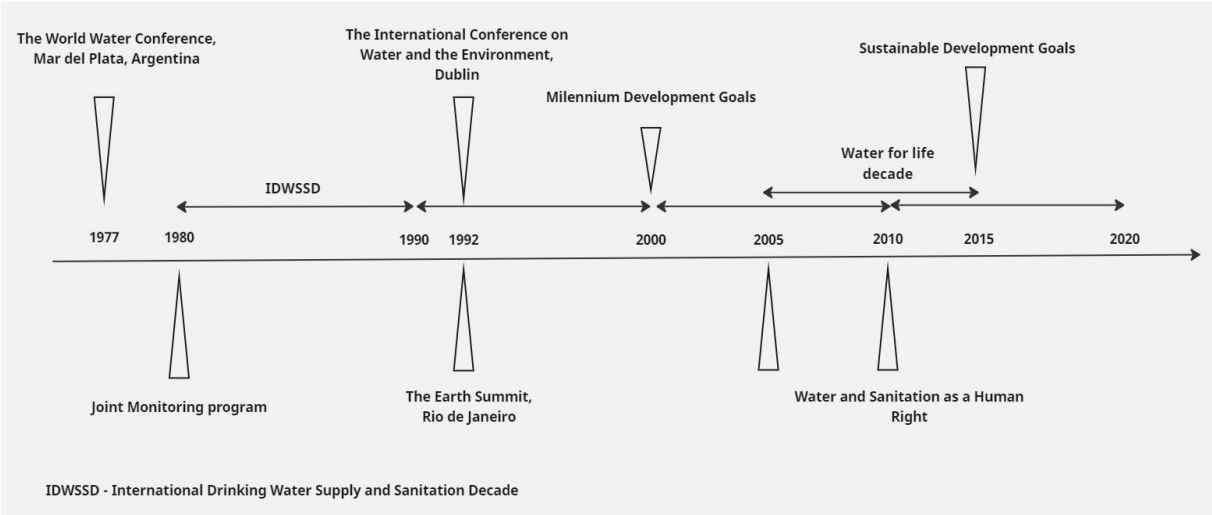
3 Sanitation in the global development strategies

Herein, I present a brief chronological overview of the coverage of sanitation in the main global strategic frameworks, reflecting briefly on the situation before Millenium Development Goals (MDGs), SDGs, and the human rights approach.

Hygienic sanitation has been already for a long time recognized as a key for the prevention of spread of diseases. The importance and efforts for more hygienic sanitation increased significantly with urbanization and population growth. However, a majority of both research literature and interventions focused on sanitation (and particularly sanitation technologies) in developed countries (Zhou et al. 2018). With respect to the Global South, ‘modern’ efforts to improve sanitation have been embedded in public health activities during colonialism. These colonial efforts were largely limited to major cities and led to immense inequalities in the access to sanitation services (e.g., Kithiia & Majambo 2020; McFarlane 2008). The colonial practices aimed at sanitation and public health were also often driven by the economic and political interests of the colonizing countries. The important objective of colonial development was to extract resources, establish control, and exploit the colonies for the benefit of the colonial powers so the efforts to manage sanitation can be seen as a specific expression of biopolitics (Engel & Susilo 2014; McFarlane 2008).

The first notable global foray into sanitation (as a part of water-related issues) was the 1977 UN Conference on Water and the Environment (see in Figure 1) in Argentina (Black 1998). It brought greater attention to what had been a neglected issue and resulted in an action plan that was important for further international activities in the WASH (Water, Sanitation, and Hygiene) sector.

Figure 1: Milestones in the global initiatives focused on water and sanitation



Source: The author

It was followed by the International Drinking Water Supply and Sanitation Decade 1980-1990 launched by the UN. The goal of the Decade was to provide safe water and basic sanitation to all people by 1990. Despite its failure to meet this goal, this initiative became a landmark in the

development of the WASH sector because of the political weight and institutional support it gave to the sanitation sector and special attention given to the technical and financial support to WASH activities in developing countries (O'Rourke 1992; Black 1998).

The evaluation (Board 1991) highlighted the need not only to provide services and infrastructure (the technical side), but also to access facilitation, capacity building, institutional reform, awareness raising (Black 1998). Even more importantly, it was argued that previous efforts focused predominantly on sanitation infrastructure (hardware) and failed to address targeted behaviour change (referred to as sanitation software) through local participation and community-based approaches to enable local involvement and empowerment (Chambers 1994; Peal, Evans & van der Voorden 2010; WHO, 2005).

New visions and principles were articulated at the International Conference on Water and Sustainable Development in Dublin in 1992. The sanitation narrative shifted from health protection to broader environmental concerns in response to the global trend towards 'sustainable development' and community participation (Tessendorff 1992).

Under the same banner of environmental sustainability, sanitation was included in the Millennium Development Goals (MDGs) campaign. Launched in 1990, the MDGs quantified global targets for reducing extreme poverty in its various dimensions, promoting gender equality, education, health and environmental sustainability by 2015, symbolised a promising start for global water and sanitation (WHO 2015). The MDGs aimed to "halve, by 2015, the proportion of the population without sustainable access to safe drinking water and basic sanitation". During the operational phase of the MDGs, a pivotal moment occurred in 2010 when the UN General Assembly passed a significant resolution formally acknowledging access to water and sanitation as a human right. This pronouncement underlined their essential role in upholding human dignity (Black 1998; Murthy 2013). The entitlement to water and sanitation aligns with the rights to physical and mental well-being and underscores the principles of human life and dignity (Murthy 2013). Importantly, communities around the world played a crucial role in advocating for water and sanitation access as a matter of justice, compelling the recognition of water and sanitation as fundamental human rights (Kirschner 2011; Scanlon, Cassar & Nemes 2004). This movement has considered the significance of water not only for survival but also as a component of cultural, religious, or spiritual practices. Sanitation have also been linked to specific socio-cultural practices, in many ways that can be even more intricate than in the case of water.

The MDGs provided a blueprint (at least formally) agreed upon by all countries of the world and all leading development institutions and spurred efforts to meet the needs of the poorest and encouraged national governments to set their own national targets (Annan 2000). Despite this, the sanitation target has been largely missed, with the same number of people without access to improved sanitation in 2015 as in 1990 (in absolute terms) due to complexity and interconnectedness of factors such as rapid population growth, limited resources, inadequate Infrastructure, conflicts, cultural and behavioral factors etc. Countries with the lowest coverage with respect to hygienic sanitation remain concentrated in sub-Saharan Africa and South Asia.

The ambitious vision for global development, called the Sustainable Development Goals (SDGs), builds on the MDGs but goes far beyond them. A new set of development goals has been adopted for a period between 2015 and 2030. The SDG target related to sanitation is covered under Goal 6: "Ensure availability and sustainable management of water and sanitation for all." The specific target under Goal 6 is to "achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations, by 2030." However, this goal has been recognised as one of the most challenging of all SDG targets (Moyer and Hedden 2020). Progress to date has been uneven (e.g. WHO & UNICEF 2019; Desphande et al. 2020), and it is unlikely that the global sanitation target will be met (UN 2018; Sadoff et al. 2020).

Critics argue that despite the recognition of its importance and inclusion into the global development strategies, sanitation has still not been adequately prioritized. Limited resources may thus be allocated to other issues that are perceived to be (seemingly) more important, pressing, or urgent, such as those around clean water or healthcare. Another problem may be a priority focus on sanitation in urban areas, which might overshadow the sanitation needs in rural regions. Achieving equitable access across both urban and rural settings can be challenging due to differences in infrastructure development, population density, and economic resources. Changing cultural norms and individual behaviours related to sanitation and hygiene practices is another important issue, not adequately understood. While it is quite certain that the SDGs sanitation target will not be met, research into these intricacies is required to make future strategies more successful.

4 Sanitation in Cambodia, India and Ethiopia

This section provides a concise overview of the basic sanitation indicators and national sanitation policies for the two countries where the primary research for this thesis was conducted. Furthermore, India is additionally included in this overview as it was addressed in the fourth comparative article.

Globally, open defecation rates have been decreasing steadily. Between 2000 and 2022, the estimated number of people worldwide practising open defecation declined from 1,3 million to 419 million, reducing by more than two thirds. In 2022, there were still 36 countries with open defecation rates between 5% and 25% with most of them concentrated in Sub-Saharan Africa and Southeast Asia, including the countries of my research interest.

Table 1: Basic development indicators and open defecation rates in rural and urban areas in India, Ethiopia, and Cambodia

	Population (millions)	GDP per capita (PPP, international dollars)			Human Development Index (HDI) ¹			Population practicing open defecation in rural areas (%)		
		2000	2022	Change (%)	2000	2022	Change (%)	2000	2017	2022
Cambodia	17	1477	4291	290	0.431	0.600	139	99	35	16
Ethiopia	123	717	2369	330	0.286	0.492	172	85	34	22
India	1417	2545	6951	270	0.490	0.644	131	92	34	17

Sources: Data on GDP and HDI are from UNDP Human Development Reports, data updates as of March 13th, 2024; Sanitation data are from JMP (WHO& UNICEF 2022).

The countries addressed in my research represent interesting and globally important examples of three distinct approaches to sanitation policies. Despite their different levels of socio-economic development, until recently the majority of rural households in India, Cambodia and Ethiopia practised open defecation (see Table 1). However, between 2000 and 2022, they achieved large reductions in open defecation (OD) rates which is a basic indicator of improvement in sanitation conditions (WHO& UNICEF 2019).

¹ The HDI was created to emphasise that people and their capabilities should be the ultimate criteria for assessing a country's development, not economic growth alone long and healthy life, access to knowledge and a decent standard of living

The reduction of open defecation is just an initial step through what has been referred to as the sanitation service ladder. The latter denotes a few different quality levels of sanitation services in the range from open defecation, through ensured access to unhygienic (called unimproved) facilities, limited sanitation service (shared latrines), basic service, and safely managed facilities (see <https://washdata.org/monitoring/sanitation>). Considering this ladder, Table 2 shows the sanitation progress in the three countries between 2000 and the most recent estimates for 2022.

Table 2: Sanitation service level in rural areas of Cambodia, Ethiopia and India in years 2000 and 2022

	Open defecation		Unimproved		Limited service		Basic service		Safely managed disposal	
	2000	2022	2000	2022	2000	2022	2000	2022	2000	2022
Cambodia	99.5	16	0.5	4	-	8	-	37	-	34
Ethiopia	85	22	15	70	0.1	3	0.3	1	0.4	4
India	92	17	7	0	0.7	8	0.3	18	0.4	57

Source: WHO& UNICEF 2022.

We can see that all three countries recorded significant reduction in open defecation in rural areas. Nonetheless, in the Ethiopian case, it was comparatively notably more by the adoption of latrines that do not meet basic hygienic standards than in India and Cambodia. It poses risks to human health due to insufficient separation of human contact from faeces (Freeman et al. 2022; Aragie et al. 2022), and also the risk of return to OD practices (Abebe and Tucho 2020).

And although Ethiopia is cited as an example of a country making rapid progress in eliminating open defecation, it will for sure not meet the SDG target (WHO& UNICEF 2022).

India and Cambodia have promoted the elimination of open defecation through the provision of improved sanitation, i.e., high quality sanitation facilities (flush/purge toilets connected to sewers or septic tanks, ventilated improved pit latrines, pit latrines with a cover). The difference between the two countries is that in India the percentages are more in favour of the highest level of sanitation, where excreta is safely disposed of on-site or transported and treated off-site (WHO& UNICEF 2022). This may be influenced by the high prioritisation of sanitation in the Indian policy context and the corresponding amount of money invested in sanitation infrastructure and hardware subsidies (Humňalová & Ficek 2020), as opposed to Cambodia where the main trigger of sanitation change is still behaviour change without hardware subsidies (Humňalová & Ficek 2020). A review that compared types of sanitation found that the incentive- construction-based interventions work best in terms of increasing coverage of improved sanitation (Garn et al. 2017; Igaki et al. 2021).

Community-Led Total Sanitation

My main countries of interest, Cambodia and Ethiopia, have adopted the Community-Led Total Sanitation (CLTS) approach as a key component of their national strategies. Moreover, our research was directly linked to the implementation of this approach in the study areas. India has also included some aspects of CLTS in its sanitation strategies, but it has been less and only partially implemented in practice, typically focusing on toilet construction rather than behaviour change (Humňalova & Ficek, 2020).

CLTS has been, and to some extent still is, a widely used approach to rapidly eliminating open defecation in rural areas, catalysing sanitation behaviour change at the community level by exploiting emotional triggers such as shame, fear, dignity and disgust (Kar and Chambers, 2008; Stuart et al. 2021). Although the success of CLTS varies by context, it is integrated into national strategies worldwide, resulting in diverse programme structures worldwide, where generalised guidance can be misleading.

Central to CLTS is the absence of external agencies providing toilets or subsidies, which promotes community ownership (UNICEF 2008; Peal, Evans & van der Voorden, 2010). It enables communities to recognise the disease pathways associated with open defecation (Mehta and Movik 2011), but risks arise, including the construction of poor-quality latrines and relapse to open defecation (Aunger 2023; Crocker et al. 2017).

CLTS targets collective social norms through persuasion and emotional appeals (UNICEF, 2015; Chambers, 2008), but its focus on community-level behaviour change contrasts with individual-level behaviour change theories (Briscoe and Aboud, 2012). Effective implementation depends on skilled facilitators, but risks a top-down approach (Peal, Evans & van der Voorden, 2010).

Despite limited evidence of effectiveness and identified risks, CLTS has been adopted in global sanitation policy due to its perceived ability to deliver results with minimal cost and effort, particularly in attempts to decentralise service delivery and increase participation (Zuin et al. 2019).

Ethiopia and Cambodia included both supply-side and demand-side programmes in their national sanitation strategies, but Cambodia, unlike Ethiopia, heavily supported supply-side programmes, which created relatively saturated sanitation markets (Kohlitz et al. 2021; Stuart et al. 2021) and increased consumer access to sanitation products. In both countries, CLTS was recognised as an effective approach for triggering behaviour change at the community level, as were sanitation marketing approaches. In Cambodia, INGOs and NGOs played a strong role in implementing their sanitation programmes, while the Ethiopian case is centrally planned and mostly government-led through the government's Health Extension Programme (HEP) and Health Extension Workers (HEW). The follow-up activities associated with and necessary for the success of CLTS also correspond to the implementation phase. In Cambodia this is mainly done by NGOs and in Ethiopia by HEWs. The third identified feature that may influence the

different sanitation trajectories towards achieving the SDGs is the issue of hardware subsidies. While Ethiopia strictly follows the guidelines of the CLTS Handbook (2008) and does not provide hardware subsidies to promote a sense of latrine ownership, the Cambodian case allows for some subsidies for the poor and those without a latrine. There is evidence that the lack of subsidies leads to the construction of cheap, unhygienic and unsustainable latrines, and further shifts towards OD.

India's national approach was different, with centrally planned, state-run and subsidised toilet construction, complemented by some information and behaviour change activities.

Cambodia

In the early 2000s, Cambodia initiated the development and implementation of the national sanitation policy and launched The Rural Sanitation and Hygiene Program aimed to improve sanitation conditions in rural areas. The key elements to achieve comprehensive coverage and improved sanitation was to enhance access to sanitation facilities through behavioural change and increased provision of products and services. Cambodia government adopted CLTS and sanitation marketing as the national strategic frameworks (Kohlitz et al. 2022; MRD 2011; Robinson 2010).

Subsequently, the government formulated a strategic plan, which was subsequently followed by an action plan with the objective of achieving universal access to sanitation in rural areas by 2025, with a particular focus on ensuring equality for the poor and those living in challenging environments (flooded zones, hard rock zones, floating communities, etc.) (Tribe et al. 2021; Kohlitz et al. 2022).

The financial support employed in the Cambodian strategy adheres to the global trend of refraining from offering hardware subsidies to extend coverage. However, there is a considerable number of INGOs, NGOs and private sector actors working in the field and providing subsidies separately to national programmes (Tribe et al. 2021; Kohlitz et al. 2021). In order to promote the coordinated and consistent use of subsidies, the Cambodian government established a set of guiding principles regarding the distribution of hardware subsidies to rural households. These principles stipulate that subsidies should only be made available to communes with a minimum of 60% improved latrine coverage and that households should be classified as poor and lacking an improved latrine by the Government in order to qualify (Kohlitz et al. 2022).

Ethiopia

The inclusion of sanitation into the Millennium Development Goals has played a major role in shaping Ethiopia's sanitation policies. The country recognized the importance of sanitation in reducing diseases and started implementing strategies to improve access to sanitation facilities. Ethiopia also adopted the CLTS approach but instead of creating of the governmental institution dedicated only to sanitation, it followed the historical trajectory of health activities and promotion. Ethiopia developed a National Hygiene and Sanitation Strategy, outlining key priorities and actions to enhance sanitation and hygiene practices across the country. This

strategy likely emphasized a multisectoral approach involving health, education, and infrastructure development.

In Ethiopia, the Health Extension Program (HEP), introduced in 2003, represents an important step forward in addressing sanitation issues. Serving as the primary implementation channel for the national sanitation strategy, HEP confirms the close link between sanitation and public healthcare policies. Likewise, the One WASH National Program (OWNP) formed in 2016, which reflects issues with current sanitation strategies, financing, and implementation, represents a welcome addition to ongoing efforts to improve national sanitation standards. The OpenWASH (2016) has acknowledged the interdependence of water, sanitation, and hygiene to universally ensure their accessibility.

India

Total Sanitation Campaign was launched in 1999 in India with the goal of accelerating sanitation coverage in rural areas. Despite advocating for a grassroots community-led approach with an increased focus on information, education, and communication efforts, it persisted in fixating on building toilets. (Hueso and Bell 2013; Barnard et al. 2013; Mohapatra 2019). Although toilet coverage increased rapidly, the subsidized toilets were of poor quality, and often remained unused (Patil et al. 2014; Coffey et al. 2014; O'Reilly et al. 2017; Sinha et al. 2017).

The program later evolved into the Nirmal Bharat Abhiyan in 2012. It was one of the most ambitious sanitation initiatives with the aim of achieving universal sanitation coverage and eliminating open defecation by 2022. It included both rural and urban components, emphasizing toilet construction, behaviour change, and cleanliness. The implementation was deemed inconsistent and exclusionary, and faced poor reception due to political interference. In addition, toilet coverage experienced only a modest increase (Routray et al. 2017; Mohapatra 2019).

In 2014, the Nirmal Bharat Abhiyan was restructured and renamed as the Swachh Bharat Abhiyan (Clean India Mission) by the newly elected government under Prime Minister Narendra Modi. The Swachh Bharat Abhiyan aimed to achieve universal sanitation coverage and make India open defecation-free by 2019 via promoting cleanliness, hygiene, and the construction of household toilets, solid waste management and wastewater treatment. It received immense political support and was prioritised. India has developed a form of 'sanitation nationalism' driven by the government and NGO sectors, which has resulted in leading to a burgeoning national dedication to sanitation and hygiene.

If we assess the results and data achieved to date, it can be concluded that all three countries have significantly reduced but not eliminated open defecation. However, Ethiopia lags far behind in terms of providing access to hygienic latrines that ensure safe faecal disposal.

5 Considered Theoretical and Conceptual Approaches

This section outlines the theoretical and conceptual frameworks that shaped our sanitation research. The primary research presented in this dissertation mainly consists of case studies based on local household surveys. However, we tried to account for drivers influencing sanitation not only at individual and household level but also the level of sanitation policies and their implementation. With some simplification, it can be said that two perspectives pursued in the papers are the focus on the role of psychosocial dynamics at micro-level scale (which aligns with known behavioural change frameworks) and the focus on the role of structural factors and wider socio-political and environmental underpinnings of sanitation change (aligns with the political ecology approach).

Of the known conceptual frameworks, our studies were informed by the so-called Toilet Tripod framework, SaniFOAM, Risk-Attitudes-Norms-Abilities-Self-regulation model (RANAS), and the Integrated Behavioural Model for Water, Sanitation and Hygiene (IBM-WASH).

Political ecology, a broader approach or a perspective helpful in examining how political-economic structures relate to environmental resources and inequalities in influencing social change (Bryant & Bailey, 1997; Daněk 2013; King 2010; Robbins 2019; Schubert 2005; Ingalls & Stedman, 2016).

From a political ecology standpoint, we assessed the effectiveness of sanitation policies, governance structures, and access politics. In Ethiopia, for example, national sanitation strategies were implemented through established health extension programs (HEP) under the Ministry of Health's coordination. These interventions, while effectively reducing open defecation rates through top-down enforcement mechanisms, also highlighted shortcomings in implementation quality due to a focus on rapid deployment over ensuring hygienic latrine construction (Novotný et al. 2018; Maes et al. 2015a).

Political ecology is one of the inspirations behind the Toilet tripod framework (O'Reilly 2017). It is a simple framework arguing that successful sanitation change depends on three overarching types of factors: sustained multi-scalar political will, social pressure (i.e., role of social sanitation norms), and adequate physical environment (underlying access to water, compatible soil type, and land use dynamics) (Bardosh, 2015; O'Reilly & Louis 2014).

Important environmental factors in the process of sanitation change are natural resources and their equity of distribution, and the socio-spatial relations (physical and social distance). In our research the physical environment appeared to be a very important aspect in scaling up sanitation infrastructure.

Firstly, in Cambodia, villages with better infrastructure, i.e. access to markets, regional health centres, material accessibility, NGO activities etc. were villages with a higher percentage of latrine owners than in remote villages. Not only were they exposed to health promotion programmes and information messages and were more accessible to NGO workers, but also construction materials were more readily available and transport costs were lower. In addition, the same results come from the Ethiopian context. The more remote village the less exposure

to HEP programme activities. Physical remoteness represents a structural barrier to sanitation due to inequalities in human, and political capital (O'Reilly et al. 2017; Novotný et al. 2018).

Secondly, natural barriers were identified as contextual factors which needed to be considered. Lack of local material and difficult terrain (stony ground, loose material, swamp areas), soil erosion or high groundwater levels. The latter causes the collapse of poor-quality latrines (mainly pit latrines), the soaking of latrine contents into the ground and, in the worst case, the flooding of the surface by latrine contents were identified.

In the context of political ecology, we outlined the relations of sanitation change with socioeconomic and environmental vulnerability and also the results showed the connection between gender inequalities in adoption of toilets. In Ethiopia, we found that female-headed households had a significantly worse sanitation outcomes than male headed households.

Political ecology projected at sanitation research addresses the politics of access to sanitation, natural resources (e.g., access to water), the equity of distribution of resources, and goes beyond simply itemising factors to look at socio-spatial relations (physical and social distance) and links them to structural inequalities.

While political ecology and related concepts (the toilet tripod) offers a frame for understanding a wider relation among society, politics and environment (King 2010; Walker 2005), it tends to disregard the behaviour change aspects. In our research we look at the individual's behaviour and individuals' self-reports; their perceptions, risks, motivations, skills, attitudes, and other drivers for sanitation change.

Conceptual frameworks provide complex, theoretical insights into how people behave, think and act in order to achieve the desired behaviour. Other considered frameworks reflect more on the behaviour change drivers. Of the multiple theories, three integrative frameworks were considered: SAMIFOAM, the RANAS model and the IBM-WASH approach.

The SaniFOAM is the conceptual behaviour change framework which helps to tackle sanitation behaviour, such as ceasing to defecate in the open, building a sanitation facility, or improving (or upgrading) one's sanitation facility (Devine, 2009). It became a leading concept in my research in Cambodia. It helped me to classify and stratify the questionnaires and structured interviews for the field research.

This approach classifies behavioural drivers under three categories: 1) Opportunity, 2) Ability, and 3) Motivation (Devine, 2009). Opportunity refers to a chance of an individual to employ the desired behaviour and relates to the group of external determinants. I looked at access and availability to products and services, product attributes that are suitable and desired by the target population, and social norms providing social permission or sanctions for certain behaviour. Ability relates to the capability of a person to change behaviour, such as knowledge, skills, social support (physical, emotional, informational), and affordability to pay for products or services. The last category embraces the motivation of individuals in the adoption of latrines. The willingness and desire to change behaviour is crucial the process of behavioural change. Determinants influencing the motivation of individuals are their attitudes and beliefs,

emotional, social and physical drivers (internal thoughts and feelings), their willingness to pay, intentions, etc. (Devine, 2009).

Mosler (2012) criticises SaniFOAM for the assignment of the determinants to the groups which does not correspond with psychological theories or he claims that determinants are too broad and overlap each other (emotional/physical/social drivers). But what he views as a key is lack of interconnection of behaviour change framework with interventions and behaviour change techniques in order to successfully achieve desired behaviour change. As opposed to the SaniFOAM, the RANAS model is being closely linked to such techniques and interventions.

The RANAS model divides psychological determinants into five blocks: risks, attitudes, norms, skills and self-regulation. All five blocks must be favourable to the new behaviour in order for the desired behaviour change to occur (Mosler 2012).

Another difference with the SaniFOAM model is that RANAS looks at a person's understanding and awareness of health risks. It looks at the perceived seriousness and vulnerability of health-related behaviours, as well as factual knowledge about how the person can be affected (Mosler 2012).

The RANAS model sets the normative factors, where injunctive and descriptive norms are considered. Descriptive norms refer to perceptions of what behaviour is commonly practised or accepted within a group. In other words, they reflect an understanding of what most people typically do in a given situation. Descriptive norms can influence behaviour through the mechanism of social proof. On the other hand, injunctive norms refer to perceptions of what behaviour is approved or disapproved of by others within a group. They reflect the perceived social pressure to conform to certain behaviours based on what is considered socially acceptable or unacceptable (Cialdini 2003, Mosler 2012).

However, the RANAS model and other conceptual models of behaviour change very often ignore or indirectly reflect broader contextual factors. For this reason, our third article (Novotný et al. 2018) included the Integrated Behavioural Model for Water, Sanitation and Hygiene (IBM-WASH).

IBM-WASH is a comprehensive classification that takes the form of a matrix with three overlapping dimensions (contextual, psychological, technological) that influence behaviour change and the adoption of new technologies/practices (Dreilbelbis 2013). These dimensions operate at the habitual, individual, interpersonal/household, community and societal/structural levels (see Table 3). This allowed us to examine the aforementioned article from two distinct perspectives: the psychosocial dimension, which encompasses factors that are readily identifiable within the RANAS model, and contextual factors, which are not susceptible to manipulation through interventions but nevertheless exert a significant influence on the outcome, particularly in conjunction with psychological or technological factors.

The IBM WASH model was helpful to us as an organising tool during the survey and we used it while organising analytical part of the third study (Novotný et al. 2018). We are aware of its limitations in expressing the interactions or causalities to different sanitation outcomes.

Table 3: The integrated Behavioural Model for Water, Sanitation, and Hygiene (IBM-WASH)

Level	Contextual factors	Psychological factors	Technology factors
Societal/structural	Policy and regulations Climate and geography	Leadership/advocacy cultural identity	Manufacturing, Financing, Distribution, promotion of product
Community	Access to markets, access to resources, built and physical environment	Shared values collective efficacy social integration	Location, access, availability, ownership, maintenance of products
Interpersonal/ households	Roles and responsibilities, household structure, available space	Injunctive and descriptive norms, Aspiration, shame	Sharing of access to product, demonstration of use of the product
Individual	Wealth, age, education, gender, livelihood, employment	Self-efficacy, knowledge, disgust, threat	Perceived cost, value, convenience, strengths, weakness
Habitual	Habit formation, barriers to repetition	Existing water and sanitation habits, outcome expectation	Effectiveness of routine

Source: Dreilbelbis et al. (2013), p.6

6 Methods

Of the four studies in the dissertation collection, three draw on primary data collected in rural Cambodia and Ethiopia and one presents a comparative analysis of sanitation policies used in India and Ethiopia. Even though methods used in data collection are in more detail described in the articles, I summarize them for particular articles in Table 4.

Table 4: Summary of methods used in the presented research papers

Reference	Objective	Design	Data	Data analysis
Humňalová (2016)	Examine sanitation situation and its determinants in rural Cambodia	Cross-sectional study focused on three communes of Kampong Chnang province, conducted in 9 villages, Cambodia	Survey among 123 households in 9 villages. 87 structured and 36 semi-structured interviews in households + 9 semi-structured interviews with village leaders + direct observation + 9 in-depth interviews with other actors (NGOs, INGOs, informants from Ministry of Rural Development)	Descriptive analysis of quantitative data and content analysis of qualitative data
Novotný, Humňalová, Kolomazníková (2018)	Examine determinants of sustained latrine use in rural Ethiopia	Cross-sectional study conducted in 11 villages of two districts, Wolaita zone, Ethiopia	Survey among 386 households in 11 villages (structured interviews + direct observations) and 20 semi-structured interviews with health extension workers and village leaders	Descriptive analysis of various sanitation-related measures across IBM-WASH domains
Novotný, Kolomazníková, Humňalová (2017)	Understand role of perceived social norms around sanitation with respect to sanitation outcomes in rural Ethiopia			Inferential statistical analysis examining relationships between measures of descriptive and injunctive norms and composite index of household-level sanitation safety

Humňalová, Ficek (2023)	Compare Ethiopian and Indian national sanitation policies	Comparative analysis based on secondary information	Review of policy documents, academic and grey literature	Comparative description of sanitation strategies across four domains: political framing, main narratives, financing, sanitation approach
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Primary data were collected through two community-based cross-sectional household surveys in rural areas of Cambodia and Ethiopia. The Cambodian survey, as mentioned earlier, was conducted during my MSc. studies in K. U. Leuven in Belgium. I used the collected data, and analysed them for the purpose of one article. The Ethiopian survey was conducted during the PhD. studies. The sample of research sites was determined by the accessibility of the villages and the time available for data collection. Time available for data collection was limited by formal permissions and organisational constraints. The field research in Cambodia was conducted already in 2012 in rural areas of Kampong Chnang province as a baseline study for the PiN (Humňalová 2012). The field research in Ethiopia was carried out in 2015 in two districts of the Wolayta zone. The villages in both surveys were randomly selected from groups defined by certain conditions (accessibility, availability of drinking water, etc.). We did the same within villages (purposively grouping areas within the village and randomly selecting households from the areas) in order to capture the diversity associated with the spatial organisation of villages.

The Cambodian survey concentrated comparatively more on qualitative data than the Ethiopian one (Table 4). On the other hand, guided by the comprehensive IBM-WASH framework, the Ethiopian household survey addressed a broader range of socioeconomic, environmental, and particularly psychosocial measures. The latter included a focus on the perception of social norms around sanitation, examined in detail in one of the papers regarding their influence on household-level sanitation safety.

The surveys also contained an observational part that collected various parameters of the availability, accessibility, and functionality of sanitation facilities. In addition, the semi-structured interviews were conducted with the main agents involved in the sanitation interventions at the grassroots level.

Research ethics issues were considered and the research was formally approved by an institutional ethical board and local authorities in both countries.

The quantitative data were analysed using common techniques of mostly descriptive statistics. In the article Novotný et al. (2017) we examined a set of hypotheses about the role of perceived social norms using the regression analyses, including some tests of statistical moderation and mediation. The main outcome considered in this paper was a composite score of sanitation

safety constructed based on 11 characteristics of availability, functional quality, and the utilization of sanitation facilities using the principal component analysis.

For the qualitative data collected in the Cambodian survey, I used content analysis. All recorded interviews (semi-structured interviews, in-depth interviews) were transcribed into English, either by me if conducted in English, or by the surveyors if conducted in Khmer. All responses were coded into categories to create a set of themes that were interpreted. Content analysis was carried out using MAXQDA software.

In the last article, a comparative analysis of two surveyed countries, India and Ethiopia, was employed to explore the sanitation policies and approaches across four domains: political framing, main narratives and legal ground, financing and sanitation approach, which is further divided into the behaviour change components and technology promoted. The two countries achieved noticeable progress in reduction of OD, and we wanted to identify the main similarities and differences between them, as well as find the advantages and disadvantages of their respective approaches.

7 Main findings and contribution of published articles

In the following section, I overview the four published articles that was included into the dissertation. The first two articles are case studies examining drivers of sanitation conditions in rural Cambodia and rural Ethiopia. The third article touches on the social and community level when it concentrates on the influence of perceived social norms and associated social pressures on toilet adoption in Ethiopia. The last article is more of a comparative analysis of national policies, strategies and approaches in India and Ethiopia.

Table 5: Summary of main findings and contributions of the presented research papers

Reference	Objective	Main findings	Contribution
Humňalová (2016)	Examine sanitation situation and its determinants in rural Cambodia	<p>The physical environment appeared to be a very important aspect in scaling up sanitation infrastructure.</p> <p>The design of the latrine and its good quality is critical to the success of sustainable behaviour change. The 'sanitation ladder' as a key assumption of the CLTS approach is not functional in Cambodian context. Hardware subsidies are needed to mobilise households and communities.</p> <p>Motives for latrine adoption other than health, such as privacy, prestige, urban lifestyle, power relations, safety or comfort needs to be tackled by sanitation interventions in order to ensure scaling up the latrine usage. Perceived affordability differs from actual affordability. The unfamiliarity with the amount of money required, contributes to not building latrines.</p>	Contributed to a better understanding of sanitation conditions by describing the sanitation situation in rural Cambodia and motivators or barriers that drive behavioural change in sanitation at the micro level.
Novotný, Humňalová, Kolomazníková (2018)	Examine determinants of sustained latrine use in rural Ethiopia	High latrine coverage and use but low functional quality with uncertain health benefits. This pattern can be attributed to a link between the political commitment translated to grassroots-level command-control pressures to construct latrines, social construction of perceptions that any latrine is good for human health, and a disregard for hygiene technology within the community.	Contributed to a better understanding of the complexities behind efforts to improve sanitation in regions characterised by limited accessibility and environmental and socio-economic vulnerability. We explained observed sanitation pattern by the metaphor of political and social construction of latrines.

<p>Novotný, Kolomazníková, Humňalová (2017)</p>	<p>Understand role of perceived social norms around sanitation with respect to sanitation outcomes in rural Ethiopia</p>	<p>Perceived sanitation social norms are strong drivers of sanitation change, but it is dependent on scale of internalisation</p> <p>Perceived sanitation social norms influence emotional satisfaction with one's own sanitation facility independently of its functional quality thus impairing upward shifts in the sanitation ladder.</p>	<p>The first exploratory study that tried to examine how perceived sanitation social norms instilled to interventions (such as CLTS) influence sanitation outcomes.</p>
<p>Humňalová, Ficek (2023)</p>	<p>Compare Ethiopian and Indian national sanitation policies</p>	<p>Political sanitation priority enables sanitation change in short time and reduce OD, but if exaggerated it may lead to politicising sanitation. Instead of making sanitation political issue, a legal framework would codify the right to sanitation and make the right to sanitation enforceable.</p> <p>The narrative of sanitation change (modernisation, health) communicated to the population provides insight into the motivations, and each has its own limitations</p> <p>The provision of at least partial financial support to construct latrines to the most socially marginalised is recommended, together with the inclusion of behavioural change approaches.</p> <p>Involve communities in latrine design and other decision-making processes to maintain ownership.</p>	<p>The juxtaposition of the two countries with different socio-political contexts and almost opposite approaches to sanitation policies and strategies highlights the advantages and disadvantages of each, and offered best practices for other countries to follow.</p>

7.1 Latrine coverage and associated factors among rural communities in Cambodia

HUMŇALOVÁ H. (2016). Latrine coverage and associated factors among rural communities in Cambodia. Case study from the Kampong Chnang Province. *Evaluační teorie a praxe* 4(2):35-39.

Research question 1: What are the individual- and household-level determinants of latrine adoption in rural Cambodia?

This study identifies the various factors that influence the adoption of latrines in micro-level with broader examination of political and contextual factors. The highlighted conclusion of this article is that the physical environment appeared to be a very important aspect in scaling up sanitation infrastructure. Two environmental factors were identified as a key to influence sanitation situation: spatial remoteness, i.e. access to markets, regional health centres, material accessibility, NGO activities, and natural barriers: lack of local materials, difficult terrain that required constant digging, and high groundwater levels.

Furthermore, latrine design was essential for successful sustainable sanitation behaviour change. Preferences arise from the socio-cultural background of local communities and the environmental setting, as well as from the internal motivations of individuals. Simple pit latrine, which was easy and mostly promoted by the government and NGOs, was not an acceptable solution. Simple pit latrines were perceived as unattractive and short-lived. Water sealed latrines were preferred. Water is an important element of purification. It is seen as a sacred substance, used to transform something dirty into something clean. Water used for flushing and anal cleansing is seen as having the same transforming power (from dirty to clean). Another reason is historical, as the use and enforcement of simple pit latrines during the Khmer Rouge regime is associated with negative memories.

Another finding was that the idea of CLTS to change behaviour at community level and to disrupt the current sanitation social norms was not proven. The opposite open defecation is considered a social norm within studied communities. Open defecation was influenced by old habits that have been practiced for generations and was widely accepted by the villagers.

To enable the construction of preferred latrines, the use of financial hardware subsidies was recommended, as the assumption of a step up the sanitation ladder is controversial and does not seem to be accepted by potential latrine adopters.

Authors contribution (100%): author of the design of the study, data collection in Cambodia, supervision of data collectors, data cleaning and analysis, author of the text.

The field research was conducted in 2012 as a baseline study with institutional and financial support from People in Need. The analysis and writing of the article were later supported by the Czech Grant Agency (GACR 15-21237S).

7.2 The social and political construction of latrines

NOVOTNÝ, J., HUMŇALOVÁ, H., & KOLOMAZNÍKOVÁ, J. (2018). The social and political construction of latrines in rural Ethiopia. *Journal of Rural Studies*, 63, 157-167.

Research question 2: What are the determinants of sustained latrine use in the infrastructure-constrained context of rural southern Ethiopia?

The second article provides an analysis of micro-level behavioural and social determinants on the one hand, and policy and environmental drivers on the other, in two rural districts of Wolayta Zone, Southern Ethiopia. It is a cross-sectional study guided by the IBM-WASH framework that seeks to understand the complexities behind efforts to improve sanitation in regions characterised by limited accessibility and environmental and socio-economic vulnerability.

The observed sanitation situation in the study area is characterised by high latrine coverage (90%) and consistent use of sanitation facilities, but their low functional quality. The article explains this pattern by employing a metaphor of “political and social construction of latrines” that according to the findings overshadowed their actual physical/material construction. The notion of political construction of latrine ownership refers to the observed political pressures and coercive practices related to the command-and-control nature of Ethiopian governance. Analogically, the notion of social construction of latrines refers to the use of behaviour-change tactics in CLTS interventions that constructed a widespread perception that any latrine is good for human health. In addition, environmental vulnerability of local communities in the study areas, closely linked to their socio-economic dependence on the environment, emerged as a key contextual feature that shapes risk perceptions, determines the priorities of local people (other than sanitation) and influences sanitation change. Physical and social remoteness and natural barriers (soil, erosion etc.) were factors limiting the appraisal of usage of hygienic latrines.

Authors contribution (35%): co-author of the design of the study, data collection in Ethiopia, review and approval of the text

The field research was conducted in 2015 with organizational support from People in Need and financial support the Czech Grant Agency (GACR 15-21237S).

7.3 The role of perceived social norms in rural sanitation

NOVOTNÝ, J., KOLOMAZNÍKOVÁ, J. & HUMŇALOVÁ, H. (2017). The role of perceived social norms in rural sanitation: an explorative study from infrastructure-restricted settings of South Ethiopia. *International journal of environmental research and public health*, 14(7), 794.

Research question 3: How do perceived social norms around sanitation affect sanitation outcomes in rural Ethiopia?

The third paper examines the direct and indirect links between perceived social sanitation norms (perception of what sanitation practices are socially approved and disapproved in a community) and a composite index of the household level sanitation safety (based on 11 characteristics of availability, functional quality, and the utilization of sanitation facilities). The study contributes to the theoretical understanding of mechanisms that operate beyond sanitation interventions, such as CLTS, that tries to establish new social norms of the unacceptability of open defecation at the community level using relatively radical persuasive tactics.

The study confirms expectation that the perceived social unacceptability of open defecation positively associates with the household-level sanitation safety. However, the study argues that this association can be ambiguous. It is shown that perception of sanitation norms enhances emotional satisfaction with one's own sanitation situation. Unlike material satisfaction, emotional satisfaction is satisfaction that is independent of the functionality and durability of sanitation facilities. People thus tend to be satisfied with poor-quality sanitation facilities, being convinced that having any latrine is a good thing. The study argues that the emotional satisfaction impairs upward shifts in the sanitation ladder by suppressing people's willingness to invest into upgrading of their sanitation facilities.

It also found that non-health (prestige, comfort, privacy, etc.) aspects of toilets were stronger predictors of sanitation safety than the perception of their health-related benefits.

The findings documented in this study may provide a possible explanation for what is known to many practitioners in the field (Robinson, 2016): the uncertain long-term impact of stand-alone CLTS interventions that have led to widespread use of low-quality, non-durable latrines.

The final finding of this study is that perceived social norms not only influence sanitation safety, but can also play a mediating role through which knowledge of sanitation and hygiene can be transmitted. This means that sanitation outcomes can be seen as dependent on social influence to shape attitudes in a desirable way.

The evidence and results suggest that sanitation outcomes depend on how social norms about sanitation are internalised. If the norm is externally determined by enforcement, or if it is based on socially constructed risks rather than driven by internal motivations, it is more likely to fail. Internalisation is a prerequisite for the long-term sustainability of sanitation interventions. Social norms were widespread in our survey, but it is less clear to what extent they have been internalised.

Authors contribution (25%): co-author of the design of the study, data collection in Ethiopia, review and approval of the text.

The field research was conducted in 2015 with institutional support from People in Need and financial support the Czech Grant Agency (GACR 15-21237S).

7.4 Sanitation strategies for reducing open defecation

HUMŇALOVÁ, H., & FICEK, F. (2023). Sanitation strategies for reducing open defecation in rural areas of India and Ethiopia. *AUC GEOGRAPHICA*, 58(1), 51-63.

Research question 4: What are the national sanitation policies and strategies of Ethiopia and India and how do they influence sanitation conditions?

The final paper provides a comparative analysis of policies and strategies at the country level. The article aims to draw lessons from sanitation policies in India and Ethiopia. Two countries that have identified sanitation as a national priority and implemented large-scale programmes, but took completely different approaches.

In both countries there has been considerable political support and will to change the sanitation situation. However, India set sanitation as a top priority and made from sanitation a strong political theme. The appeared concern seems to be the politicisation of sanitation. Programmes became too important to fail, and officially reported achievements are often exaggerated (Curtis 2019; Exum et al. 2020). One possible precaution to keep politicians accountable and entitled to sanitation, rather than responsible for it, is to codify the right to sanitation in national legislation, which neither Ethiopia nor India have done.

Political narrative used by both countries differs. Ethiopia follows the conventional construct of sanitation as a health issue (preventing the spread of disease, malnutrition, etc.), while India frames sanitation in the context of modernisation efforts. These divergent narratives provide a deeper insight into the different motivations and subsequent outcomes of sanitation policies with both facing a certain challenge. The health is a type of narrative with intangible and long-term effects, and combined with Ethiopia's 'command and control' governance, it leads to high numbers of latrines constructed, but also high rates of slippages back to open defecation. On the other hand, linking latrine adoption to modernisation and cleanliness means an immediately measurable target and a stronger impact but it does not target behaviour change and use of the latrines.

The two countries use different strategies to achieve sanitation change. Ethiopia followed a global trend in using CLTS. The Indian programmes, on the other hand, relied heavily on subsidised toilet construction, with only marginal behaviour change activities. The study debates the use of both changing social norms and providing at least partial financial support to individual as a way for achieving widespread improved sanitation.

Authors contribution (50%):

The field research was conducted in 2015 with institutional support from People in Need and financial support the Czech Grant Agency (GACR 15-21237S).

8 Conclusion

Once seriously neglected, sanitation research has increased substantially over the past decade. Partly as a result of the gradual accumulation of evidence, the popularity of approaches used for sanitation interventions has changed, recognising that (comparatively cheap) behavioural approaches (such as CLTS) are not a silver bullet if not accompanied by appropriate attention to ensuring sustainable access to hygienic sanitation infrastructure.

In this context, the aim of my doctoral thesis, chosen almost exactly 10 years ago, was to study the sanitation situation in Cambodia and Ethiopia and to examine the various factors that influence sanitation conditions and the outcomes of sanitation interventions. Many of the findings presented in this dissertation are consistent with what has been reported concurrently in other literature on sanitation in different parts of the Global South. However, our research also provides some new, original insights that enrich the literature in this important area.

One of the findings that may seem quite basic from today's perspective is the importance of the physical environment and remoteness in the sanitation situation. This includes factors of the natural environment (e.g., soil type) as well as the man-made physical environment (e.g. transport infrastructure), which determine the accessibility of adequate sanitation services (e.g. O'Reilly et al. 2017). The physical remoteness of villages, combined with socio-economic and political-institutional remoteness, was identified as a key barrier to the expansion of sanitation infrastructure and services (including both specific interventions and general development, education and public health services) in both Cambodia and Ethiopia. In addition, the geographically heterogeneous nature of the natural and cultural environment poses significant challenges to scaling up access to improved sanitation facilities and ensuring their suitability to the specifics of the local context (such as rough or unstable soil, high groundwater levels and regular flooding, water scarcity, access to natural resources such as construction materials, rainy or dry climate), but also cultural specificities and norms. The argument that various parameters of the physical and socio-cultural environment play a consequential role is very general. However, I believe that it has particular relevance to sanitation conditions, which are particularly dependent on human-environment interactions. The aforementioned arguments are also of particular relevance to the rural areas surveyed, which are characterised by the environmental vulnerability of local communities and their socio-economic dependence on the environment.

In addition to the social and natural environment, sanitation is also closely related to politics. Political will and support are prerequisites for efforts to improve sanitation conditions through interventions. Our findings indicate that prioritising sanitation can result in a significant reduction in open defecation within a relatively short period of time. Nevertheless, we also found that this represents merely the initial stage in the process of improving sanitation. If political support is not sustained and the focus is not extended to further steps - such as upgrading sanitation facilities to meet basic hygiene standards or facilitating the safe disposal of faecal waste - the resources invested may be wasted.

Furthermore, our research indicated that there is a potential concern regarding the politicisation of sanitation and its misuse for political competition. This may result in the overreporting of

actual progress, as observed in India, for instance. One possible solution to avoid political exploitation is the codification of the right to sanitation in national legislation, as none of the studied countries have done. The political narrative in which sanitation is embedded also shapes the success of sanitation change. The narrative becomes the primary message for the adoption of latrines, which is then communicated to the population. Improvement of health, was a conventional message in Ethiopian context. Consequently, our research identified the widespread awareness of the potential links between latrine use and health with the recognition that any latrine is good for human health. However, this understanding was not accompanied by the recognition that this is only true for sanitation facilities that meet basic hygienic standards and are adequately managed. We observed that the latter holds for a tiny minority of available latrines in Ethiopia. The communicated narrative thus created a false perception that may actually lead to more dangerous sanitation conditions than the previous prevalence of open defecation. People themselves are not able to trace and recognize the cause-and-effect relationship between latrine use and health based on their experience (due to substantial delays of health effects, dependence on practices of entire community and a large number of confounding factors) so the narrative spread across population matters a lot.

Furthermore, another complex issue related to sanitation politics (and public health politics more generally) that we observed in Ethiopia and, to some extent, in Cambodia is its use for the purpose of population control. Although this population control, which can be considered a form of biopolitics, focuses on sanitation behaviour, it also serves as a means for broader social control and surveillance. In particular, we observed the use of formal and semi-formal sanctions for not constructing and not using latrines (irrespective of their quality) that reflected the command-and-control nature of the sanitation approach and the top-down style of governance in Ethiopia. Similarities were also observed in Cambodia. The advantage of the top-down approach is that programmes can be implemented rapidly. However, without a facilitated trigger, long-term follow-up, and without establishing a sense of ownership, there is a high risk of unsustainability.

This phenomenon can be understood as a consequence of the process of internalising the new social norm surrounding sanitation. Our findings indicate that suboptimal outcomes may arise when compliance with a new sanitation norm is enforced externally or based on socially constructed symbolic risks rather than driven by internal motivations.

In the context of arguments above, we found certain problems associated with the use of CLTS as a national stand-alone approach. First, CLTS pushed the households towards locally available, non-durable, low-quality latrines. Furthermore, it did not facilitate the upgrading of latrines and, on occasion, even deterred users from undertaking such an upgrade. Second, in both field surveys the idea of moving up the sanitation ladder was not observed and one of our studies from Ethiopia provided a possible conceptual explanation. We found that perceived sanitation norms influence emotional sanitation satisfaction which is the satisfaction with current sanitation practices independent of the functionality of the latrine. Third, CLTS is based on a principle of no external subsidies for the construction of latrines as they tend to discourage the sense of ownership and impede behavioural change. Consequently, it is a relatively inexpensive approach, which makes it an attractive proposition for government decision-

makers. However, the above-mentioned problems suggest that wisely used financial support could play an important role and may actually be required for facilitating hygienic sanitation in infrastructurally and socioeconomically disadvantaged communities such as those in our study areas.

The results of our studies have demonstrated the pivotal influence of social norms on the adoption of sanitation practices. The social norms may defend current sanitation practices, such as OD. In Cambodia, open defecation was widely accepted within the community, a phenomenon that had been perpetuated over generations. The survey, conducted in 2012, did not identify any social or peer pressure to change the behaviour in question. In Ethiopia, on the other hand, social norms and pressures were strong, resulting in high latrine coverage. Nevertheless, recent studies have demonstrated a problem of slippage back to OD, also due to inadequate and low-quality latrines (Abebe & Tucho 2020; Kouassii et al. 2023).

The individual perspective is thus influenced by, but not limited to, the top-down narrative. Behavioural change at the individual level is influenced by a person's ability to change behaviour (knowledge, skills, ability to pay, etc.) and willingness and desire to actually change behaviour (attitudes and beliefs, intentions, feelings, etc.). The lack of resources was still identified as a significant constraint for the construction of latrines. The study in Cambodia identified a distinction between perceived and actual affordability. The perceived costs were found to be higher than the actual prices on the market. A lack of familiarity with the market and the costs of products may contribute to a lower demand from households.

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10 Appendix

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