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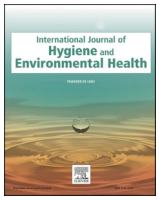

Does peer learning improve local government capacity to improve sanitation? A contribution analysis in rural Mozambique

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ABSTRACT

Strengthening local government capacity to improve sanitation and other basic services is a challenge in many low resource countries. There is growing interest in peer learning as a mechanism to spread successful practices and increase local government performance in the settings. However, few studies have investigated if peer learning leads to changes in practices and improved results. The study aims to identify and evaluate the causal linkages between peer learning activities and any changes to participants capacity, local government practices and increases in sanitation coverage in rural districts. Contribution Analysis, a theory-based evaluation approach, was used to design a longitudinal study investigating outputs, outcomes and impacts of two peer learning workshops between Open Defecation Free (ODF) Districts and non-ODF Districts in Mozambique alongside the enablers and barriers to change. The research draws on a survey of 66 participants directly after the workshops and 29 semi-structured follow-up interviews nine months later. We found that despite broader structural challenges that hinder progress in sanitation service provision, the workshops enabled the spread of knowledge of good practices (outputs) some of which were replicated (outcomes). There is evidence that these replicated practices accelerated progress towards ODF status (impact) in some districts. We demonstrate that under the right conditions peer learning can nurture local learning, improve knowledge, spread frugal practices and lead to incremental improvements in local government performance. We therefore recommend it be integrated into broader programmes to maximise benefits.

1. Introduction

It is estimated that over one million preventable deaths a year are caused by diarrhoeal diseases due to unsafe sanitation, hygiene and drinking water (Wolf, 2023). Further benefits of safe sanitation include increased cognitive ability in children (Orgill-Meyer and Pattanayak, 2020), reduced undernutrition and stunting (Budge et al., 2019) and reductions in several neglected tropical diseases (WHO, 2018) and anxiety and psychosocial stress (Sahoo et al., 2015; WHO, 2018). Yet, 42 per cent of the world's population rely on sanitation that leads to untreated human waste entering the environment and 354 million people practice open defecation (UNICEF and WHO, 2025) (see Table 1).

With decentralisation progressing in many countries, local governments are often the only structures with the mandate to expand and manage sanitation services at scale (Perez et al., 2012). Yet, this mandate has not been coupled with the appropriate capacities and resources to deliver (Keatman et al., 2016; Huston and Moriarty, 2018). Bottlenecks in service provision are almost universally linked to budget constraints, but are compounded by weaknesses in the performance and availability of human resources (Booth, 2011). Yet, much development work continues to focus on policies, programmes and projects without considering the capability of those tasked with implementation (Andrews et al. 2017). Emphasis is placed on top-down reproduction of "best practices", taken from wealthier countries transferred to another, over-burdening administrations and setting them up for failure (Andrews et al., 2013; Pritchett et al., 2012). With constrained resources

Abbreviations: CA, Contribution Analysis; DNAAS, National Directorate for Water Supply and Sanitation's; ODF, Open Defecation Free; PEC, Community Education and Participation; SDPI, District Services of Planning and Infrastructure; ToC, Theory of Change; WOP, Water Operators Partnerships.

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for sanitation programming and capacity development available from national governments (taxes), aid agencies (transfers) or users (tariffs), there is growing interest in peer learning as a cost-effective way to strengthen capacities and enhance performance of local governments and service providers (Odagiri et al., 2020; USAID, 2023).

We define *peers* as people with similar roles responsibilities, resources and power, working in similar contexts and sharing common challenges. "Peer learning" has been used to describe a range of different activities including peer reviews (Humphries, 2011; Nicolini et al., 2011; Carcellar and Kerr, 2012), learning networks (Gouët and Paassen, 2012; Ingrams, 2017) and communities of practice (Sallán et al., 2012; Lave and Wenger, 1991). Activities can vary in time and effort, from one-off events to initiatives that take place over a number of years. Despite varied usage, they all involve sharing knowledge and experiences and the diffusion of this learning back into organisations (Andrews and Manning, 2016). Peer learning can strengthen skills and capacities and improve practices (Humphries, 2011; van Ewijk et al., 2015; Lahiri and Rajan, 2020). Both peer-*teachers* and peer *learners* benefit through the uncovering and identification of achievements and lessons learnt (Humphries, 2011) and exposure to knowledge and experience from outside (van Ewijk et al., 2015). It also boosts motivation and confidence, and generates momentum for change (Nicolini et al., 2011; van Ewijk et al., 2015; Lahiri and Rajan, 2020).

Most research to-date has focused either on peer learning between local governments in high income countries or international initiatives - usually from the global north to global south, though sometimes south to south. There is limited work concerning peer learning activities in low resource settings or empirical studies that move beyond post-training data collection methods to assess outcomes and impacts. This gap makes it difficult to use the current evidence base to inform national capacity strengthening activities in low- and middle-income countries (Andrews and Manning, 2015). We seek to address this. This longitudinal study examines causal linkages between peer learning activities between local governments and changes to participants capacity, individual and sub-national government practices and increases in sanitation coverage in rural Mozambique. We investigate if, how and under what contexts peer learning can lead to desired change.

2. Methodology

In this section we provide background to the study setting and the research design including methods used to collect and analyse the data. We also include details regarding ethical considerations and a statement on positionality.

2.1. Study setting

In Mozambique, 24 per cent of the rural population, approximately 4,943,828 people, practice open defecation (UNICEF and WHO, 2025). The Government of Mozambique's National Rural Sanitation Strategy (2021–2030) aims to eliminate open defecation and achieve universal access to basic sanitation by 2030, core to this is Community-Led Total Sanitation (CLTS), which facilitates communities to analyse their own sanitation practices, triggering communities to take actions to become Open Defecation Free (ODF) (Sanitation Learning Hub, 2025).

Despite the development of a strategy, public investment in water, sanitation and hygiene is minimal, inconsistent and fluctuates sharply. Since 2013 the budget for water and sanitation has ranged from 3.8 per cent in 2016 to 1.1 per cent in 2021 (Rebelo, 2024). Spending on rural sanitation is significantly lower. In 2019 only 1 per cent of the National Directorate for Water Supply and Sanitation's (DNAAS) budget went to rural sanitation (UNICEF, 2019). The District Services of Planning and Infrastructure (SDPI) are tasked with the planning and management of sanitation and water services, however, budgets remain centralised. In 2019, 98.4 per cent of the budget stayed with the central government (ibid). Capacity is also a concern. Less than 50 percent of the work force needed to deliver rural sanitation are in place and constraints related to financing, education and training, competencies of staff, and skilled workers not wanting to live and work in rural areas (GLAAS, 2022).

Despite these challenges, over 2021 and 2022, with support from UNICEF, Guro, Macossa and Manica Districts in Manica Province and Tsangano, Marara and Angonia Districts in Tete Province were declared Open Defecation Free (ODF). UNICEF commissioned a study to identify the leverages and blockages of success in achieving District-wide sanitation coverage in these areas (Uandela and Coultas, 2023) and co-hosted two regional, three-day peer learning workshops with DNAAS and the Sanitation Learning Hub in February and March 2023. The workshops brought together SDPI staff from ODF and non-ODF districts, development partners and provincial and national staff. In total, 91 people participated across the two workshops, with representatives from six ODF Districts, 15 non-ODF Districts, six provinces, DNASS, community leaders and development partners.

Presentations on the National Rural Sanitation Strategy and the UNICEF commissioned study were given in the morning of the first day before participants worked in district teams to reflect on and document their own experiences. On day two teams presented their experiences through a participatory market-place exercise, visiting District stalls to identify practices they could incorporate into their own work. On day three districts were encouraged to situate what was learnt through the development of action plans. The workshop methodology had been developed to support implementers of the Swachh Bharat Mission-Gramin (the Clean India Mission-Rural), the world's largest sanitation campaign to (Myers et al., 2023; Chambers, et al. 2018). This was the first time this workshop methodology had been used in Mozambique.

2.2. Research design

Contribution Analysis (CA) was used as a framework to design the research. CA is a theory-based evaluation approach used to assess if an intervention contributes to outputs, outcomes and impacts. This is done through gathering evidence of causal claims, contextual factors and rival explanations across a Theory of Change (ToC) and producing credible evidence-based narratives referred to as 'contribution claims' (Mayne, 2012; INTRAC, 2017). Theory-based evaluation approaches have been used to evaluate complex development programmes in changing, dynamic environments (Ton and Vellema, 2022). CA has been recommended for public health research when developing and evaluating complex interventions, when understanding their usefulness and to support the development of an evidence base to refine future interventions (Silva et al., 2016). It has been used to evaluate healthy eating programme in Australian schools (Biggs et al., 2014), Scotland's national alcohol strategies (Wimbush et al., 2012), economic development interventions in Canada (ibid), economic policy in Ireland (Buckley, 2016), advocacy campaigns on Supreme Court decisions (Patton, 2012), a health science training programme (Choi et al., 2023), a public health research centres work on tobacco control measures (Riley et al., 2018) and the Paris Declaration on Aid Effectiveness (Patton, 2012).

An initial *working* ToC (see Fig. 1) was designed based on Crocker et al.'s (2016) conceptual framework for evaluating and training programmes in water, sanitation and hygiene and the UNDP definition of capacity building (UNDP, 2009). The ToC assumes that peer learning activities (inputs) lead increase a participant's individual capacity, including changes to knowledge, skill and motivations (output). Improvement in an individual's capacity will lead to improved individual and organisational practices (outcomes) leading to improved performance and an increase in sanitation provision (impact). Evidence was collected around this ToC (outputs, outcomes and impacts) including contextual factors and the exploration and consideration of rival explanations.

2.3. Methods

A survey was completed by 66 people (72.53 per cent of workshop participants) immediately following the workshops. The survey included Likert Scale questions with space provided for respondents to add additional details to explain their response. Questions focused on learning acquired, attitudes and motivations, ability, planned changes to practices, planned dissemination efforts and anticipated challenges they may face replicating practices. The survey was developed in English and translated into Portuguese. Responses were translated into English before analysis. The survey can be found in the supplementary materials.

Five follow-up questions were sent via WhatsApp three months after the workshops. In total 28 people in total responded (30.77 per cent of participants) to all five questions.

Semi-structured interviews were undertaken nine months after the workshops. All those whose contact details we had were sent a message via WhatsApp asking if they would be willing to participate. We aimed to interview all those who responded positively. Respondents from Manica, Sofala, Tete and Zambeiza Provinces were interviewed. Due to time constraints the team were unable to visit Nampula Province. Interviewees represented National Government, two development partners, three Provinces and 14 Districts. Questions covered lessons learnt, whether these were applied, effects on programming, contextual factors which enabled or hindered change and importantly for CA, rival explanations and other influences which could have impacted change along the proposed ToC. The interview guide can be found in the supplementary materials.

All interviews 29 interviews (31.88 per cent of workshop participants) were undertaken by the lead author, for 27 an interpreter was used. The two interviews with representatives from development partners were held in English – one virtually. The other 28 interviews took place in person. One of the interviews was conducted with two representatives from DNASS together. Interviews lasted between 30 min and 1 h and 30 min. Table 1 shows the number of research particpiants that engaged in each activity and Table 2 shows the workshops and subsequent data collection methods over time.

Table 1
Number of participants, survey and WhatsApp respondents and interviews per workshop.

Workshop number	# participants	# surveys	# WhatsApp respondents	# Interviews
1	37	31	14	15
2	54	35	14	14

Table 2
Workshops and subsequent data collection methods over time – AUTHORS OWN.

Month	Activity
February–March 2023	Workshop one (29th Feb-3rd March) – Survey
April–May 2023	Workshop two (7th-9th March) – Survey
November 2023	WhatsApp questions
	Semi-Structured Interview

Sonix (Sonix Inc, 2023) was used to transcribe and translate the interview transcripts with both the initial Portuguese and English translations checked by members of the research team.

2.4. Data analysis

Data was analysed in stages when available. Immediately following the survey, responses were collated. Likert-scale tables were made for each quantitative question, with numbers of responses and percentages. Qualitative responses were collated under each question. This was used to develop an interim report which was shared with DNAAS and UNICEF.

WhatsApp responses were collated on Excel (Microsoft, 2016) as they were received and added to a second interim report.

For the semi-structured interview transcripts NVivo 14 (Lumivero, 2023) to code thematically. Initial themes were training design, knowledge, skill and motivation (output), practices (outcome), improved programming (impact), rival explanations and contextual factors. During the analysis process sub-themes emerged as they were identified. This helped identify the data in relation to specific lessons learnt, changes made and the potential impact of these changes.

Based on this analysis evidence-based plausible contribution claims were developed relating to outputs, outcomes and impacts. These are presented in the results section of this paper.

2.5. Ethical consideration

Ethical approval was obtained from the University of Leeds (MEEC 22-012). Information was provided about the background of the study, the voluntary nature of participation, ways to withdraw consent and the anonymous use of data before written consent was obtained from all research participants.

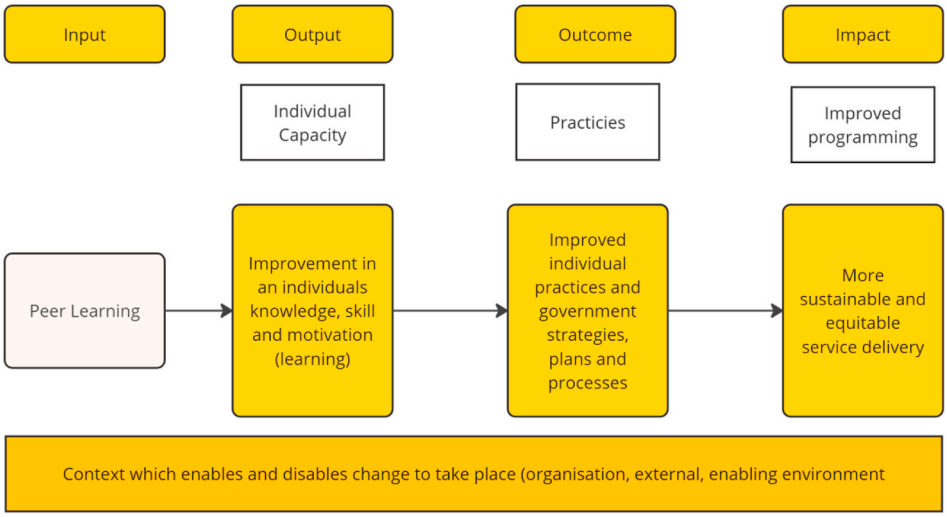

Fig. 1. An initial working theory of change – AUTHOR'S OWN.

2.6. Positionality

The lead author is white British, UK-based and non-Portuguese speaker working with partners and research participants from different racial, experiential, and cultural backgrounds. Mozambique was also new working context for him. In addition, he co-designed the workshop, supported the facilitation and conducted the interviews, with research participants associating him with these events. Advice was taken throughout from colleagues working in Mozambique. One member of the authors is Mozambican, who provided additional advice, interpretation and translation. Though new to this particular context the lead author and the wider team have substantial experience in rural sanitation internationally. Furthermore, the interviews were designed to explore the context, as an integral part of the analysis. At the beginning of each interview it was stressed that we were there as researchers rather than development partners.

3. Findings

In this section we present the findings of the outputs, outcomes and impacts of the workshops. The section ends with an overarching contribution story and an updated ToC.

3.1. Output contribution claim: peer learning leads to changes improvements in participant's capacities

Most survey respondents reported learning from their peers (92.4 per cent), with qualitative survey responses highlighting they had learnt through interactions with people from other district as well as from the community leaders present. Respondents reported learning about specific ways to accelerate progress towards area-wide sanitation (93 per cent) and ways to deliver a more equitable (71.2 per cent) and sustainable service (86.4 per cent). Across the two workshops 86.4 per cent reported learning about innovations, methods, processes or approaches, with qualitative responses providing specific examples including: establishing sanitation committees and forums at different administrative levels to support coordination, community engagement tools, follow-up, monitoring and evaluation efforts and the importance of local leadership. WhatsApp respondents highlighted both generic and specific lessons. Respondents cited general lessons about the Rural Sanitation Strategy, different methods and techniques and ways to achieve and maintain ODF status. Specific practices cited included signing letters of commitment to build toilets and creating sanitation committees and forums.

In the follow-up interviews a plethora of specific examples of lessons, practices and skills that were learnt from peers were reported. These related to resilient sanitation technologies, broader stakeholder engagement, sanitation committees and forums, commitment letters, sanitation sponsors and community engagement mechanisms.

Interviewees recounted learning about the active engagement of District Administrators. One reported: *'What struck me, that I remember, were the strategies some districts used to achieve ODF. Examples from Guro and Macossa, where the administrators are trying to achieve a change in behaviour … Some districts gave examples of the strategies they used …. For example, in open government sessions [community meetings] the administrator always takes time to visit the latrine of the community leader … He also does this when he goes to visit, always takes time to visit a latrine. This is also motivating. It motivates the leader'* SDPI Sanitation Technician.

Another reported '*We also learned that there is this need for the Administrator to have some actions in his activity plan every month which has to do with sanitation because the administrator's monthly programme always includes visits to the communities. The localities [communities] are visited. There has to be some action on sanitation.'* SDPI Director.

Commitment letters were recalled in interviews: '*They also brought us the experience of a letter of commitment where they monitor families that have or don't have latrines, and those that don't have latrines must do so. The head of the household has to write a letter committing himself, saying how long they will take to build a latrine … it's also an experience that we think is really good'* SDPI Director.

Another participant noted *'there was the signing of a memorandum, a commitment, a letter of commitment between the district government, with the head of the posts, head of the post with the head of the locality and, in turn, the heads of the locality also had to sign a letter of commitment with the community leaders and community authorities. So the experience that struck us is this level of involvement in the government structure, with very clear goals.'* SDPI Director.

Regarding motivation, 89.4 per cent reported being motivated to improve their practice and 90.9 per cent left motivated to implement their action plans. These points were also apparent in the qualitative responses. For example, one respondent reported: '*This seminar motivated me a lot, through the exchange of experience from other districts and provinces for the improvement of our activities.*'

Contextual Factors: Attitudes to the workshop were overall positive, 93.9 per cent reporting that it was of good quality, 89.4 per cent agreeing the workshop was fun and 87.9 per cent reporting that it was useful. Qualitative responses highlighted that lessons learnt were relevant and applicable to their context, useful and productive. In regard to gaps, some requested a field visit, longer workshops, reading materials, wider participation from other districts and colleagues working in other departments and stronger focus on budgets and resources.

In interviews participants continued to be positive about the training design; noting that they appreciated learning from peers through the interactive marketplace and situating lessons learnt through action planning. Interviewees reported liking the experience of learning from other districts and provinces and gathering experiences that could be replicated.

A sanitation technician working for a district in Sofala said: *'The event was very good. It was very good because each district had to bring three experiences that we could also implement, that we thought were different or that could make a difference in our district.'* While a District Director in Zambezia Province reported: '*The continued exchange of experiences in the training sessions, the mass of ideas to come together, there is greater learning, because we manage to capture or collect experiences and we manage to implement them in the light of what we were already doing.'*

Also mentioned in interviews was learning from both facilitators and participants and the inclusion of different administrative levels (from national to community level), including community leaders who provided participants with new examples of what they had done in their individual communities. An interviewee working at the National Directorate for Water Supply and Sanitation commented: '*One thing that also really struck me was the scope of this seminar, because apart from the technical sector, there were also community leaders, chiefs and people who are actually on the ground. They brought some experiences and these were shared.*'

A participant from an Administrative Post reported *'I ended up being very moved by community leaders presenting what they have been doing in their communities, their experience.'*

The fact that the process enabled reflection was noted as beneficial, one interviewee reporting: '*it helped me to reflect on new things and try to find new experiences to try to implement in my district*' SDPI Sanitation Technician.

Finally, there was demand for similar events indicating that the training was appreciated and valued.

Rival explanations: Participants could have already known about

lessons and practices or acquired knowledge and the practices cited through other trainings they have participated in. One interviewee reported: *'It [the activity] started after the seminar, but we had already being doing it. But it wasn't very strong, but then we started to intensify it'* SDPI Director.

Furthermore, in some instances lessons had been learnt from technical experts in the room including from the National Directorate for Water Supply and Sanitation, WaterAid, UNICEF and the Sanitation Learning Hub.

3.2. Outcome contribution claim: knowledge and skills exchanged through peer learning leads to improved individual and government practices

Respondents to the WhatsApp survey reported establishing sanitation sponsors and sanitation forums, promoting competition, not issuing building permits before latrines are built and broadcasting messages via radio, indicating some introduction of new practices based on the knowledge acquired.

A range of changes were reported in interviews. The most commonly cited ones, the number of district reporting them, additional details about what was being done differently and illustrative quotes are provided in Table 3.

Other reported changes included increasing the intensity of efforts, 'stepping-up' or revitalising activities (reported by four districts) demonstrating an increase in motivation. Also mentioned were expanding participation of different stakeholders (reported by four districts); and the use of commitment letters whereby households, community leaders and heads of administrative post write letters to the administrative level above them committing themselves to improved sanitation in a given timeframe (reported by three districts).

One interviewee reported: *When we do the monitoring for the communities, then the families that don't have latrines, the head of the household, has to write a letter of commitment saying that in a week's time, in two weeks' time, I'll have my latrine. And after that time, we come back again to monitor whether or not that commitment you signed … to make your latrine a reality.*' SDPI Director.

Another stated: *'I think the most important one that I tried to implement here in the district, for example, was this issue of the commitment letter that the community makes.'* SDPI Sanitation Technician.

Contextual factors: Regarding barriers, financial resources to implement plans or to travel to communities with insufficient vehicles and petrol were cited as persistent problems.

One interviewee remarked: *'It really is very difficult. For reasons of resources, logistics, fuel, allowances, means of transportation … We were lucky enough to be declared ODF, but as a result we were unlucky enough to lose ODF* funding*, because we had already been declared, so they didn't leave a ODF maintenance [budget] line … we have difficulty with transportation … you have to use the motorbike and we don't have one.'* SDPI Director.

Another noted: *'Well, the budget, the budget for sanitation activity. Well, we have had the* support *of UNICEF, but for monitoring activities on the ground. But in terms of actually* funding *the activities on the ground, we don't have that budget, it's just for monitoring the activities, which is to guarantee fuel for the technicians to go to the communities.'* SDPI Director.

Practices which have been implemented were either integrated into existing activities, required no budget, only implemented in areas that can be accessed (close-by District headquarters) or were only taking place in districts with continued financial support from development partners. The SDPI is understaffed, often with one person who works on sanitation, with the department previously dependent on consultants to deliver sanitation related activities.

The timing of the workshops impacted outcomes. Workshops were held in February and March, and district planning take place at the end of the calendar year making it harder to incorporate lessons learnt into existing plans. Interviewees also reported the need for a supportive district leader; and monitoring, sign-off and engagement of Provincial authorities. Differing contexts including population and geographical size, environmental conditions, whether advocacy efforts are considered acceptable, and availability of materials were all cited as reasons for reduced outcomes. Finally, those who had achieved ODF saw themselves as there to impart knowledge, as teachers, rather than being there to learn and change their own practices.

A SDPI Director for an ODF District stated *'we took part, [and are] ODF. Maybe it was to give a boost to the other districts that were there, which aren't ODF yet.'*

Another noted *'The essence was practically to gather our experience, how we have already achieved ODF status, so that we could pass on to other colleagues who have not yet achieved it. What we have done to achieve it, and to make it easier for colleagues who have not yet achieved it to also copy our experience or what we have done to achieve the status.'*

In summary, practices are more likely to have been adopted if districts were not yet ODF, District Administrators were committed and supportive and budgets, however small, were available.

Rival explanations were probed during the interviews to identify if practices were pre-existing or introduced through other interventions. Participants reported other training also contributed to their knowledge and subsequent practices. With regards to resilient sanitation technologies one interviewee noted: '*Well, from that meeting, apart from this one, we only had another one here in Zambezia province … which also uses the same system of building latrines based on these bamboos.'*

Another rival explanation was Districts learnt from hired NGOs, community-based organisations and private companies, who were either currently or had previously undertaken Community Led Total Sanitation and other community-based activities – referred to as locally as PEC (Community Education and Participation Consultants). A Sanitation Technician reported: '*Since 2020 we have the company from the social area that does the PEC and outside of that we also have the company from the social area, which has also* supported *us to do this work.'* In some Districts these organisations were withdrawing, with SDPI taking over. One SDPI Director from an ODF District explained: '*Because what happened is that in the past, we practically had the consultant doing that activity … Normally there was already a contract with a budget available and so we didn't do that, because we had the staff [consultants] on the ground. So it was at this seminar that we learned that there will no longer be a budget to keep our team there … So what we did afterwards was, say "okay, let's draw up our plan". At least the radio interactions can continue to spread the word so that communities don't regress, don't continue to engage in open-air fecalism.'*

Some practices, like sanitation forums, had previously been present in some districts but were no longer being held or participation was limited. In these circumstances changes included re-establishing dormant structures, expanding participation or introducing them to lower administrative levels.

In one district intensified efforts were triggered by a cholera outbreak: '*Okay, fine. Apart from the seminar, there were other things that helped to intensify things. It's the very situation we found ourselves in. The one I was talking about is the issue of the cholera outbreak. It was also one of the things that ended up helping us to intensify.'* Preventative Medicine Technician, Public Health Department. The interviewee described sharing the practices learnt at the event with the rest of the cholera response team and using the lessons learnt in their response.

Table 3
The most commonly cited replicated practices.

Practice	# Districts reporting	Details	Illustrative quotes
Sanitation forums	9	Multi-stakeholder platforms responsible for planning, monitoring and supervision of sanitation activities have either been established, re-established, established at different administrative levels or in places where they were absent. Other interviewees reported forums have increased in regulatory and expanded participation.	'*Before the seminar we had in Chimoio, we didn't have sanitation forums … All these tactics were born through the seminar.'* SDPI Director. '*We've been revitalising it through monthly meetings. In order to strengthen the group …. we have involved community leaders, religious leaders and more influential people at community level.'* SDPI Sanitation Technician. '*The revitalization and creation where there were no sanitation forums, from the district, administrative level down to the local level, and now we are moving down to the communities …. As soon as we got back from Tete, we held the District Sanitation Forum, which was guided by the administrator. It is also the result of our report that all the heads of stations, localities, community leaders, NGOs and other people involved in sanitation were called in.'* SDPI Director. *'As soon as we returned from Chimoio, there was a need to set up these forums … [previous forums] were a bit of a failure. Sometimes it only happed at district government level … there was a need to restructure … the forums should be extended to the localities.'* SDPI Sanitation Technician.
Engaging community leaders	7	Engaging with community leaders including disseminating lessons learnt, providing space for them to share their ideas and experiences and engaging them directly in activities.	*'Before, they didn't participate, but after we included the community leaders, we gave them ownership of the programme, because what is necessary is to instil in people the idea that you are the owner of this programme. So we want your community to be free of open-air fecalism and to take responsibility.'* SDPI, Sanitation Technician. '*We also met with community leaders to instil this Marara experience so that they could also implement it in their communities. But we also realised that in our communities, some leaders didn't have latrines.'* SDPI Director.
Active engagement of Administrators and Directors	5	Administrators and Department Directors discussing sanitation and requesting to see latrines when on community visit.	'*We made a detailed presentation [about the seminar] and since then we've also made the administrator the sanitation champion. And in the government sessions [community meetings] too, when they also go the localities, it's all about latrines.'* SDPI Sanitation Technician. '*the recommendations that we brought back in the form of a report and the seminars. We've noticed that, as well as taking part in almost all the forums we've held, but also in all the outings we've had to the localities to interact with the population, you always set aside some time to talk about sanitation.*' SDPI Director. *'The directors of different areas are, for example, when a health director goes to visit a health centre in a community, he always goes there and has that meeting with those employees or with the health staff and with some patients. So he also talks a bit about sanitation. When a director of education goes to visit a school, in the meeting he attends or guides, there is a part that has to talk about the issue of school sanitation … this began practically after we returned from Tete to integrate them to be in the programme too.*' SDPI Director
Resilient technology	5	Sharing information about improved sanitation options and the lining of pits using locally available materials	*'That process of building improved latrines on movable soils is one of the techniques we learnt there and are doing here … We explained it … we call community leaders … We've already done it in about five communities.'* SDPI Director. '*Well, firstly, what we replicated has to do with the model of building resilient latrines. Because we have an area prone to flooding … So there is some local material, bamboo and we have made some latrines with these standards that we took from this meeting we had in Tete.'* SDPI Director.
God parents/sanitation sponsors	4	Introducing or revitalising Directors of different district services (health, education etc.) being made 'God Parents' or 'Sanitation Sponsors' responsible for overseeing sanitation in a particular locality.	*'Another has to do with the directors of the district services. Each director of the district services has an area of jurisdiction that is responsible for this component of sanitation. There's a locality, there's a post that he manages in terms of sanitation. It serves as our focal point to get some information about that community.'* SDPI Director. *There have always been sponsors for issues related to education, but now we are also taking advantage of them as sponsors to address issues related to sanitation …. from those exchanges … we also found this to be a good experience.'* SDPI Sanitation Technician. *'The godfather concept also started in 2020, but perhaps what has been done is to go back and revitalize it and put other people in, because some, perhaps in 2020, some have already moved on, they're no longer here, they weren't here. Then we'd have to reappoint someone else in order to fill the sponsor position.'* SDPI Sanitation Technician.

3.3. Impact contribution claim: improved practices are implemented by relevant stakeholders, driving an acceleration in the quantity of service provision

Evidence of improved programming is less extensive. A member of one district's team reported:

'*The main thing I've learned and one of the good experiences we're trying to follow [is] the community letters to community leaders. This is having an effect here in our district, in one of the localities here in the district. We have the town of XXXX, where we are currently receiving a letter from some of the leaders, the chiefs of the town, asking us to come and assess the community for ODF status'* SDPI Sanitation Technician.

Another district reported: '*We have managed to increase the number of communities to be declared as ODF. First of all, it was thanks to the advocacy work we did that we were able to make the message understood, the approach of the sanitation programme in the new post that we opened on a new front, which is XXXX. We managed to get a strong involvement and commitment from local chiefs and chiefs of the post.'*

One district reported using lessons learnt and replicating practices which supported the final push towards the achievement of ODF, but that much work had been undertaken before.

'Today I am only free from open-air fecalism thanks to that seminar. That exchange of information … almost everything I've said here comes from that seminar … I was already at 80–90 per *cent of the sanitation coverage in my district. So I knew how much further to go. So, in those communities that still needed to be completed, it was those communities where I went straight to attacking so that we could achieve ODF status today … I got together with those leaders every week and brought back that information, that Marara experience, that Marara experience I learned there [at the seminar]'* SDPI Director.

UNICEF reported replicating the workshop in two districts, bringing together community leaders to share their experiences. This was viewed as having helped in the final push towards an ODF district. It is further evidence of the high value participants saw in learning from community leaders, who are often not engaged in these types of activities.

Contextual factors: The dissemination of knowledge is important in supporting changes in practice needed to improve sanitation in communities. Initially after the event 84.8 per cent reported planning to share the findings of the workshop with colleagues. Qualitative responses identified forums for sharing the information learnt at the workshop. These included meetings, seminars, working groups and sanitation related groups.

Interviewees reported sharing and disseminating lessons to colleagues and stakeholders through provincial and district meetings, district stakeholders including administrators and other district departments. One interviewee report that: *'after we got back from Tete, we had a replication session to give some technical knowledge. What did we learn in Tete and how are we going to do it here in our district.'* SDPI Director.

Lessons learnt were also shared with communities and community leaders through spaces like sanitation forums and when on community visits. One District Sanitation Technician reported: *'we would go out into the community to give talks on how to build resilient latrines.'*

There were few examples of systematic knowledge sharing across relevant stakeholders. However, two districts reporting developing a dissemination strategy to share lessons learnt with localities across the district.

Other barriers reported are similar to those shared by sanitation programming more broadly – constrained resources, limited staff, unengaged and unsupportive leadership and sanitation not being prioritised.

Rival explanation: The clearest rival explanation is that the small changes and progress reported were already underway and would have been achieved without the input, albeit not as soon.

A development partner reported: *'Even for XXX and XXX yes I am saying that they did the follow-up, but those district were almost ODF so we cannot affirm definitely that now the rise of the ODF status was because of this. I can say that it contributed for this last stage but the other results were already there.'* Development Partner, Maputo.

3.4. An updated theory of change

Fig. 2 below shows an updated ToC. Participants appreciated and enjoyed the interactive peer learning process. It enabled them to identify useful, relevant and replicable practices and to reflect on how these could be used in their own work. The process strengthened participants' motivations and knowledge around specific lessons and practices that had been found to be successful by others that could increase sanitation coverage. Lessons and practices cited in questionnaires and interviews were consistent, with interviewees reciting specific lessons and activities learnt, alongside the districts and provinces where they had taken place. The data also shows that participants learnt from having multiple administrative levels present – including community leaders who are often not engaged and consulted. Participants left motivated to improve their work and replicate practices. **Consequently,** the evidence collected demonstrates plausible causality between the peer learning workshops and improvements in capacity.

With constrained budgets and a limited work force, a light touch peer learning activity alone could not overcome the broader challenges facing the sanitation sector in Mozambique. Despite these constraints there is strong evidence that lessons learnt were shared with relevant stakeholders, including communities, and activities were replicated. This indicates that peer learning initiatives can spread good practices and influence incremental, frugal changes to strategies, plans and activities. Activities were often ad hoc, run in a small number of communities or small in scale. At-scale replication was constrained by insufficient resources including personnel, vehicles and budgets.

There is evidence that certain practices learnt about and adopted led to an acceleration of progress in some locations. It may also be the case that a nine-month gap between workshops and the final round of data collection is insufficient time for impacts to emerge.

In summary, the process supported the consolidation and sharing of good practices; these were replicated at a small scale and lessons learnt were shared with colleagues in other departments and those working at lower administrative levels. Evidence of whether the practices replicated led to the acceleration of coverage is less conclusive, however there are some indications that this did take place. Given the constraints for this to result in area-wide impact would require a multi-pronged approach that tackled the broader systemic challenges in the enabling environment facing sanitation in Mozambique and similar low resource settings. We infer that peer learning activities accompanied by increased resources, including budgets and staff, would enable at-scale replication and area-wide outcomes.

4. Discussion

In line with the rest of the article the discussion is structured around the ToC. First, we situate our findings in relation to the outputs, outcomes and impacts, we then move on to the context and the broader benefits of peer learning. Finally, we provide reflections on the method and the use of Contribution Analysis.

Regarding outputs, our study demonstrates empirically that a well-designed peer learning process can have a substantial effect on the skills, knowledge and motivation, and therefore capacity, of rural local government staff in low-income countries. This aligns with research from other contexts that have highlighted the benefits peer learning can have on building skills and capacities and improving practice (Humphries, 2011; van Ewijk et al., 2015) and strengthening motivation, commitment and confidence (Nicolini et al., 2011; van Ewijk et al., 2015). Galvanising and maintaining motivation, commitment and confidence, alongside knowledge and skill, is important given that rural sanitation jobs in these contexts offer unattractive salaries and poor working conditions with high staff turnover (USAID, 2023). Rural

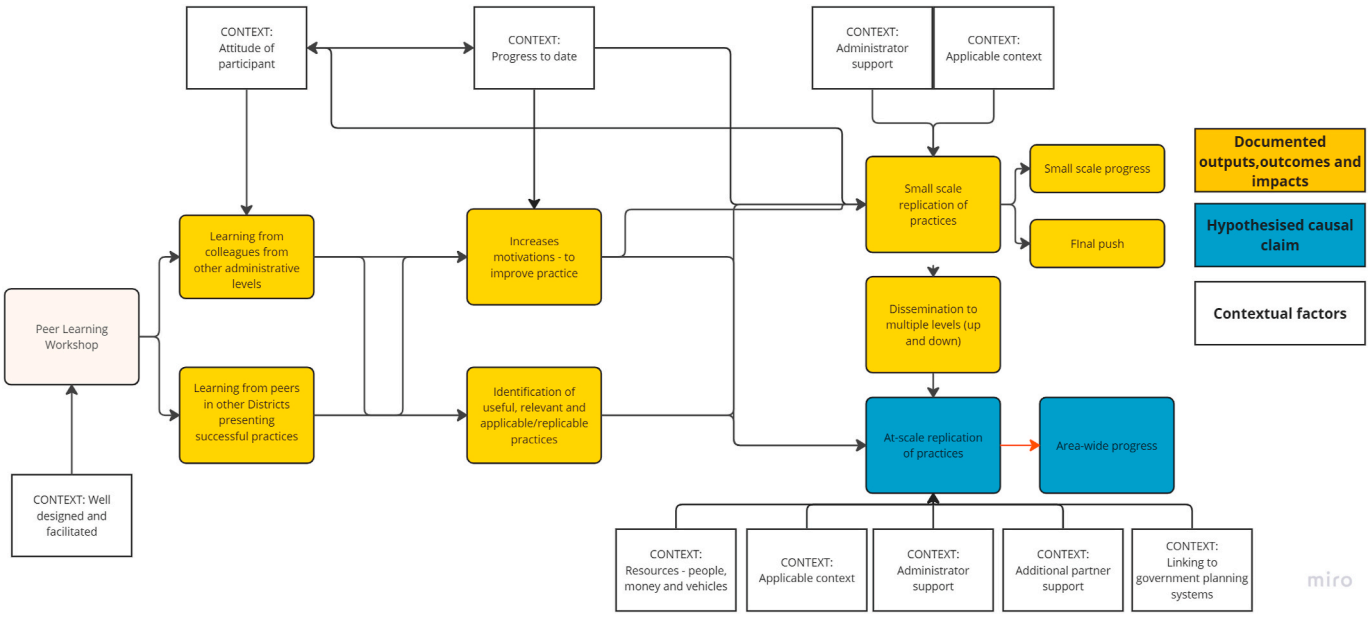

Fig. 2. An updated theory of change – AUTHORS OWN.

sanitation government jobs can also be lonely, with limited opportunities to learn from colleagues around you and c**hances of engaging in Communities of Practice. Consequently, there is a need to purposefully facilitating these opportunities.**

At the outcome level, our findings demonstrate that peer learning activities in low resource settings can spread good practices, influence incremental, frugal changes to strategies, plans and activities and are a valuable tool as part of a broader set of activities to accelerating sanitation coverage in rural settings. We were unable to identify analogous examples of documented peer learning activities in similar settings which reduced our ability to compare against wider literature. However, Water Operators Partnerships, peer supported partnerships between water and sanitation utilities, usually in urban areas, have also been found to play a supportive role in improving their performance, provided the availability of adequate access to finance, political support, and clear and open communication between partners (Wright-Contreras et al., 2020). Where the research into Water Operators Partnerships has argued for the need to invest in a small number of multi-year partnerships rather than a greater number of short-term partnerships (Stephens et al., 2022) and long-term organisation commitments (Malembam et al., 2024) our study has highlighted the value in investing strategically in opportunistic, lighter-touch, wider peer learning activities when successful practices start to emerge.

Moving on to impact, the broader constraints that hinder at-scale improvements in sanitation services, such as insufficient resources and administrator support, are similar to those that drive or hinder progress in service provision more generally. As we move further along the ToC evidence of contribution becomes less clear, however we still see traces of changes at the impact level, future research should explore this further. There is the possibility that the outcomes and impacts have been under-detected. Follow-up interviews took place in October 2023, nine months after the workshops. Any evidence of practices would likely feature in the following years District Development plans, with evidence of improvements emerging even later.

We have also demonstrated the importance of the context in which peer learning activities take place, especially financial resources and the ability to integrate plans into ongoing plans. In addition to this is the types of knowledge that is needed to undertake a task or provide a particular service. Lessons learnt and practices replicated in our study were predominantly around strengthening rural governance processes, increasing participation of relevant stakeholders to support sanitation and hygiene promotion and the building of basic infrastructure. The type of peer learning activities needed for more complex environments, such as densely populated urban slums and higher tech faecal sludge management systems will likely be different with more intense processes and more intensive peer learning approaches being important; this could help explain the diversion of findings between research on Water Operators Partnerships, which focus on more complex urban systems, and our study.

Another contextual factor is the age and maturity of a given intervention. Community-Led Total Sanitation was first introduced into Mozambique in 2008, and a lot of experience was gained through the One Million Initiative Program (2006–2013) which aimed to support one million people to gain access to an improved latrine. This programme laid the groundwork for the success of the first districts to be declared ODF in 2021 and 2022 (Uandela and Coultas, 2023). In 2023 there was enough experience to draw from and a greater understanding of what was driving change to be able to disseminate these practices horizontally. A certain level of experience and understanding is needed before peer learning becomes effective. In this regard, despite the constrained resources, Mozambique is at a good moment for peer learning to help accelerate progress in rural sanitation.

Finally, following-up with participants as part of the research process has helped identify a range of frugal practices that have been replicated. Practices like sanitation forums, engaging community leaders and District Administrators etc., that were used without additional resources have the potential to be rolled out across the country by districts operating under similar financial constraints. We therefore see a huge value in aligning peer learning activities with sufficient monitoring and evaluation not just as a way to assess outcomes and impacts but to capture replications in order to increase understanding of what is possible under the current conditions. These practices can then be spread more widely.

Finaly, a note on methodology and study limitations. Capacity development initiatives are difficult to evaluate. All researcher faces problems with attribution when assessing outcomes and impact. We used CA to weigh evidence, evolve a ToC and develop plausible explanations of causal pathways. A criticism of CA is that it is likely to 'always find a contribution of some kind. In essence, the concern is that treating contribution as the criterion (rather than direct attribution) is so weak that a finding of no contribution is highly unlikely.' (Patton, 2012, p.376). There are also well -known challenges with self-reported data

including social desirability and recall bias; both could have influenced interviewees' responses. Furthermore, positive responses could be linked other benefits received such as per diems. We counteracted these problems by using methods that aimed to identify direct linkages between lessons learnt from peers, the districts where they came from, improved practices and improved services. We also undertook different rounds of data collection and throughout the analysis explored and investigated rival explanations and contextual factors throughout. Though findings are not generalisable for all circumstances, we have built on frameworks, theories and previous research, to provide relevant insights for the potential of peer learning in similar settings. Finally, research participants were overwhelming male. Of the 66 survey respondents, 7 were female, 36 were male and 13 did not respond to that question. Only two of the 29 interviewees were female. This reflects the sector in Mozambique and across most of the world. Future research should explore gendered differences.

5. Conclusions

In many countries there is a large gap between the human resources and budgets needed to achieve the SDGs and the realities on the ground. Decentralisation of responsibilities have not been matched by the necessary drives to strengthen capacities and there is almost no evidence on how best to do this. Over ten years ago, seminal work by Pritchett et al. (2012) and Andrews et al. (2013) proposed a shift away from copy-paste models of development, outlining the need for Problem Driven Iterative Adaption as an alternative and improved approach to build state capability. In later work Andrews and Manning (2015) highlighted that despite the popularity of peer learning, the outcomes and impacts had received very little empirical scrutiny in low resource settings. Through this article we seek to change this. We conclude that identifying what has led to success in particular contexts and enabling the horizontal sharing of these between peers can support capacities and incremental improvements in local government performance. Identifying uptake indicates practices that can be promoted widely. A more sophisticated peer learning process involving a variety of activities, stronger follow-up and accountability over a longer period of time or embedding peer learning into a broader programme would lead to greater benefits. It would nurture local learning, knowledge and experience and develop and support incremental institutional reform processes. Therefore, we advocate for more investment in this space accompanied by a research agenda that aims to strengthen the evidence base.

CRediT authorship contribution statement

Jamie Myers: Writing – review & editing, Writing – original draft, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Énio Tembe:** Investigation. **Paul Hutchings:** Supervision. **Jamie Bartram:** Supervision. **Barbara Evans:** Supervision.

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Appendix A. Supplementary data

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