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Not just a donor learning experience: Exploring failure, accountability, and harm within a large aid funded biogas project in Malawi

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ABSTRACT

In Africa, investments in domestic biogas projects have yielded mixed results, with numerous poor outcomes reported. While many commonly cited barriers contribute to these failures, the role of structural issues rooted in development and aid remains underexplored and poorly understood. This investigation examined 72 tarpaulin-based biogas digesters funded by UNDP across seven districts in Malawi, which experienced rapid failure shortly after implementation. Unlike many biogas studies focusing on symptoms of failure this research focussed specifically on the governance and decision-making processes that led to failure. In-depth interviews with 65 of the beneficiaries and 15 stakeholders revealed that the project failed due to poor management, unclear leadership, and weak governance. The digesters were hastily installed in remote areas that had no local expertise just before project funding expired, amidst suspected corruption and a lack of biogas expertise among all project stakeholders. The project lacked accountability to beneficiaries, leaving them powerless to influence change in their own development project. Far from being a harmless learning opportunity, as it was described by some of the project's stakeholders, the project caused harm to beneficiaries who invested limited resources into the poorly executed biogas intervention. This study challenges the typical user-centred focus of failure analyses and underscores the importance of focusing on structural causes of failure. By focussing on systemic issues, we can foster more informed discussions on biogas projects. Moreover, this approach enables accountability to beneficiaries, which can inform decision-making regarding potentially flawed projects and help to hold institutions responsible for harm caused.

1. Introduction

We sat together on a woven grass mat in the shade, 20 m from a long shallow pit, where the tattered scraps of a shredded biogas digester could still be seen under the sand. The owners, an elderly couple who have lived here in their village their whole lives, gestured to what remained of the PVC[1] bag as they spoke, “The digester came to us unexpectedly; we did not prepare for it, and did not have time to make that arrangement.” Between 2016 and 2018, the United Nations Development Programme (UNDP) supported the construction of 72 tarpaulin-based biogas digesters across seven districts in Malawi - Malawi's largest biogas intervention at the time [1]. These owners, one of the 72 households chosen, had no prior knowledge or experience with biogas, but had been identified as potential beneficiaries by the local agricultural officer because they had cattle - necessary for providing sufficient feedstock for the digester. Once selected, the owners were instructed to prepare a site for the new bag, which entailed digging a pit and lining it with bricks,[2] and once the bag and stove had been installed, stockpiling enough manure to load and start the system. The installers came over several days to connect the system, and once the digester was in place, “got into their cars and left.” At first the owners were highly satisfied: pleased with the initial cooking flame they got after start-up, happy with the attention they were receiving from jealous neighbours, and enthusiastic about the potential long-term cost savings in fuelwood and fertiliser that their system would provide. However, very quickly this excitement turned to disappointment. After less than a month of

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[1] Polyvinyl chloride.
[2] Though they were later told to remove the bricks.

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operation, gas production dwindled and died, and with no maintenance or troubleshooting training, the owners were unable to reverse the decline or restart the system, and as the husband described, "There was nothing we could have done because we didn't know anything. We thought that if we would do anything, then we could make the problem worse." The local agricultural officer who had been involved in picking beneficiaries was notified of the issue, but after visiting he was unable to solve the problem and told the owners they must wait for the installers to return to fix it. The installers never returned, and as the owners stopped feeding the digester, it slowly deflated, sinking into the pit they had laboriously dug.

In conversation, the owners remained sanguine about biogas, but bitter about their own personal experience. They had invested substantial time and energy into the project, having been promised unlimited fertiliser and free cooking fuel, while realising little actual benefit. In their view, they had been chosen to host a technology they had never heard of, or asked for, and after investing their own time and energy to make the installation a reality, were not provided the training or support necessarily to make that investment a success. "The problem is we did not receive expertise to manage it; they only told us how to use it in the hole, but not how to fix any problem. Had we received training, I'm sure we wouldn't have had any problems". Although they were positive about the support from the local agricultural officer, they were dismissive of the installer and other project actors they couldn't identify who had simply 'come and gone in big cars' with only superficial engagement with the beneficiaries. For these biogas owners who were promised a better life, positive change has not occurred, and rather, real harm has been done. Aside from their initial investment in time, labour, and materials, the owners feel that by accepting the digester they missed out on other interventions that might have made a more meaningful difference in their life.[3] Although this is just one experience, it nonetheless raises important questions for biogas development, and donor-funded projects more broadly. When a beneficiary is promised a certain benefit, and that benefit does not materialise, who is responsible? When biogas projects fail, who is accountable, and what is the responsibility of the funder to ensure expected outcomes?

The purpose of this paper is to examine biogas failure, both its underlying causes and the impacts that failure has on beneficiaries, through an in-depth investigation of the 72 UNDP digesters installed in Malawi between 2016 and 2018. Evaluations conducted by Mzuzu University in 2019 and 2021, and commissioned by UNDP, revealed a significant failure rate; with the majority of installations ceasing to function shortly after their setup [1]. The university's report pointed out that the benefits anticipated from these biogas plants were largely unattained, despite investments of time and resources by the beneficiaries. However, the Mzuzu report did not provide adequate explanations for the disappointing outcomes of the UNDP biogas installations. While the report noted deficiencies such as inadequate training for users and a lack of after-sales services, it failed to explore why the UNDP and the Malawian Ministry of Energy (MoE) initiated a biogas project without ensuring these critical components were included. Although these observations are consistent with other investigations into failed biogas projects, the report nonetheless raises further questions about how such a significant and high-profile intervention can fail so spectacularly and underscores the need for a more comprehensive investigation into the project's planning and execution.

Conducting our own investigation, which draws on an extended period of fieldwork between 2022 and 2024, including 65 interviews with affected households and 15 stakeholder interviews with relevant individuals involved within the implementation project, our intent is to present a more nuanced analysis of what went wrong within this instance of biogas provision, and how these failures have impacted beneficiary households. Our investigation pursues three specific research objectives. First, to unpack the original aims of the UNDP biogas project and understand how they were interpreted by both beneficiaries and other project stakeholders. Second, to investigate the causes of the project failure and explore accountability within stakeholder arrangements. Third, to examine repercussions of failure for beneficiaries, while assessing accountability for implementing bodies and exploring the potential for reparations for those adversely affected. What distinguishes this paper from conventional evaluations is its critical engagement with the deeper structural and governance-related roots of failure, rather than focusing solely on surface-level issues such as poor training or inadequate maintenance. Drawing on a neo-Foucauldian conceptual framing, particularly James C. Scott's *Seeing Like a State* [2], we centre project governance to interrogate how planning, control, and institutional arrangements contributed to failure—and how accountability mechanisms function (or fail) in such aid-funded projects. This analytical lens enables us to move beyond diagnosing technical shortcomings and instead examine how systemic institutional dynamics shape development outcomes. We find that in addition to the shortcomings outlined in the Mzuzu report (lack of training, maintenance, and support), the project's failure was rooted in poor management, unclear leadership, and muddled project governance. In addition, the project was characterised by a lack of accountability to the intended users, with project implementers framing the project as a pilot, and emphasising learning outcomes over beneficiary benefits - an intent that was never communicated to users and serves to write off the impacts of project failure on beneficiaries. Furthermore, our findings suggest that there have been human consequences of project failure, and that beneficiaries suffer real harm from failed projects, be it wasted time and effort like with the owners discussed previously, or more significant substantive investments in building material, labour, or feedstock. Moreover, through a lack of accountability, this harm is more often confronted by recrimination and mutual blame-shifting than meaningful discussions of repair, redress, or reparations. Ultimately, we conclude that this lack of services and accountability has hindered biogas development, both in Malawi, and across other Global South contexts where biogas interventions have proliferated– a conclusion that also has broader ramifications within the donor-driven aid space [3]. As such, it is our intention to provide substantive insights from this intervention that can shape more effective, accountable governance in future projects, while enriching the academic discourse on project management in international aid, particularly within the biogas space. These contributions are particularly needed because they address contemporary critiques of aid-driven development and underscore the importance of learning from failure in global development efforts.

2. Development, aid, and biogas

'Development' is a powerful term that lacks a universally accepted definition, but broadly refers to change in a system or its elements [4]. In the social sciences, development is often implicitly seen as positive, with Chambers [5] describing it as simply 'good change'. Thomas [6] provides a more nuanced view, noting that development includes a vision for societal progress, a historical narrative of advancement, and deliberate efforts for improvement. Since the mid-20th century, economic aid to low- and middle-income countries under the banner of 'international development' has aimed to foster economic growth and reduce poverty, promoting 'good' change [7]. However, development aid has faced significant critique, both for the assumptions and power dynamics underlying it and its mixed results in reducing poverty. Escobar [7] and Ferguson [8] critique aid-driven development for labelling certain regions as "underdeveloped," thereby justifying interventions by "developed" nations. These simplifications lead to interventions that often fail to account for local realities [3]. Additionally, international aid is frequently criticized for replicating neoliberal policies that foster debt

[3] They particularly mentioned interest in solar, as well as a 'Wonderbag' that they had seen at a church event.

and corruption rather than economic growth [9–11].

Biogas digesters, through a process of anaerobic digestion, facilitate the conversion of organic waste materials such as food waste, animal dung, or faecal matter into energy-rich methane gas: biogas. Producible at the household level, biogas can be used for cooking or lighting, as a replacement for burning biomass. For this reason, household biogas digesters have been an often touted intervention for achieving numerous developmental and environmental outcomes since as early as the 1960s [12–15]. As a result, significant amounts of money have been spent by international donors and development organisations on biogas projects across the Global South. Although there have been successes, like in within China, Nepal and India's large-scale biogas programmes, and many of the Netherlands Development Organisation (SNV) funded programmes in Africa and Asia [16], where massive state and international investment has led to widespread biogas adoption, as Kalina et al. [17] note, many biogas projects, particularly within African contexts, have had dismal results, with hundreds of failed projects scattered across numerous African countries, including Malawi.

Biogas interventions have largely been insulated from the broader critiques of aid-driven development. In a previous opinion piece, we identified a significant gap in research on the governance failures underlying these programs [3]. Instead of focusing solely on surface-level issues such as inadequate training or maintenance, there is a pressing need to examine why biogas projects are repeatedly implemented without addressing these essential components and to analyse them through a development critique lens. Through this case study, we aim to deepen the understanding of the repercussions of failed biogas projects for users and to unravel the complexities of accountability when international organisations, the state, and informal actors are all involved.

3. Conceptualising biogas development

Household biogas development has generated a tremendous amount of scholarly output. Yet, as Kalina et al. [17] note, much of this work has been uncritical, focusing on forecasts and potential benefits, rather than engaging with the structural factors which guide biogas implementation and which impact project outcomes. As a result, there remains a significant gap for research which connects biogas investments to development theory. To what degree have household biogas schemes been rooted within historical developmental trends? How do stakeholder dynamics within these schemes mirror or challenge traditional systems of power? In a space in which neoliberal global development institutions exercise a predominance of decision-making, what role is there for citizens and the state? We feel that not only are these connections underexplored, they are poorly understood, and as a result, contemporary biogas development has remained rooted in long since discredited modernist developmental paradigms that have protected and enhanced neoliberal institutions at the expense of the individuals for whom biogas installations are meant to elevate and serve.

Although theorisation around biogas development remains a fruitful space for future scholarly work, we offer a few concepts we have found useful towards understanding relationships within the case study, and for conceptualising aid-driven biogas development more broadly. First, in development studies, scholars frequently attribute the recurrent failures of development projects to the dominance of top-down, technocentric approaches that disregard local knowledge and context. These approaches often simplify complex issues like poverty, treating them as technical problems that can be resolved solely through technological solutions and top-down planning. James C. Scott's [2] concept of *mētis* versus *technē* underscores this critique by illustrating how local, practical knowledge (*mētis*) is often ignored in favour of abstract, standardised methods (*technē*). This neglect leads to interventions that are ill-suited to the nuanced realities of local communities. Similarly, James Ferguson's [8] analysis in *The Anti-Politics Machine* highlights how development initiatives frequently overlook political and social complexities, focusing narrowly on technical solutions and thereby failing to address the broader systemic issues at play that are causing the very problems they are trying to address.

Scott advocates for a humbler and context-sensitive approach to development that values local knowledge, diversity, and adaptability. The tendency to disregard local knowledge in favour of technical expertise is an unfortunate trend within waste management studies, where poor households are more frequently viewed as problems that need externally imposed solutions, than as sources of information or innovation [18]. Within the biogas space, these same generalisations have tended to result in one-size-fits-all technological fixes for-over simplified problems [3].

Secondly, analysing development projects through the lens of their indirect effects reveals significant insights into the [un]intended consequences that may arise, even when the projects fail to achieve their formal objectives. Both Michel Foucault and James C. Scott draw attention to the peripheral outcomes of development interventions, particularly the profound social changes that can occur. Foucauldian conceptions of development as an apparatus of control underscores how these projects, whether successful or not, often extend the reach of the state, increasing its ability to monitor and standardise populations. For instance, in Ferguson's study of Lesotho, a decentralised development project formally failed, but it resulted in the state gaining closer proximity to rural communities through mechanisms such as tax offices and monitoring systems. This points to the role of development not only as a tool for progress but as an instrument for state expansion and control.

While not all development projects can be generalised — a small biogas project, for example, may not have the same broad impact as large-scale initiatives like those in Lesotho — there are still important indirect effects to consider. Even smaller projects, such as those implemented by the UNDP in Malawi, involve global organisations and state actors, and as Scott would argue, these entities represent the broader machinery of the state. Thus, it is essential to look beyond the formal boundaries of the project itself to understand the wider implications, including the ways the state may use the project to exert influence. This invites the question of whether a failed project truly fails if it successfully extends state control and meets other, perhaps unspoken, objectives.

Finally, when development projects involving both the state and international organisations fail, the question of responsibility becomes complex. According to Foucault [19] development is a process used by the state to reorder society, making it more legible, manageable, and taxable. Scott [2] similarly argues that the state holds the ultimate economic and coercive power to fundamentally reshape society, positioning it as the key authority in development efforts. However, while the state may be the principal actor, its success depends on its ability to listen to and respect the wishes of its citizens. In a context like Malawi, even as a democracy, the state has a history of weak governance and corruption, raising concerns about how citizens can hold development actors accountable and if they have the means to do so.

Scott's critique of top-down state actions is particularly relevant here, as these projects often fail precisely because they ignore the very people they are supposed to benefit. Projects driven by international organisations such as the UNDP, in collaboration with governments, may be designed to serve broader regional or national goals, but they risk overlooking the needs and input of local communities. In the case of Malawi, the relationship between the UNDP and the government adds another layer of complexity, as accountability is not only local but global. When a project that aims to improve the lives of the poor has negative impacts on beneficiaries, it raises critical questions: who is accountable? How can citizens—who may lack power, voice, and transparency—seek redress when harmed by development initiatives?

4. Methodology

The purpose of this investigation is to understand the impacts of top-down biogas provision, and the accompanying chains of accountability

which surround donor-driven projects. To explore these objectives, we utilize a case-study research design, with a specific focus on the 72 tarpaulin-based household digesters installed between 2016 and 2018, clustered in rural communities across seven districts in Malawi, a small, land-landlocked nation in south-eastern Africa. Despite its reputation as a donor favourite and being the target of substantial foreign aid and investment, Malawi is consistently ranked among the poorest, least developed, and most corrupt countries in the world [20,21]. In addition, Malawi has been plagued by persistent electricity shortages, exacerbated by a weak economy and acute fuel shortages, and as a result, the majority of the population lives in severe energy poverty, abated by continued reliance on burning biomass at the household level for cooking and heating, drawn from ever dwindling fuelwood stocks [22,23]. In response, Malawi has been the target of numerous investments in renewable energy technologies, including biogas, but without a coherent framework for transforming the country's energy profile [17].

The 72 tarpaulin-based household digesters that are the focus of our investigation, represent the largest investment in biogas within Malawi, at the time of our study. Part of a broader 'Sustainable Energy Management' project funded by the UNDP, which sought to pilot innovative renewable energy technologies over its four-year span, the digesters were installed over a two-year period between 2016 and 2017 in a number of rural communities across seven districts (shaded in Fig. 1) spread across all three of Malawi's major regions[4] [1]. Although the project was funded by UNDP, it was implemented by the Malawian Ministry of Energy (MoE), utilising a local biogas installer (Intrinsic Energy) [1], and using local agricultural extension workers as facilitators between the beneficiaries and the implementing stakeholders.

Our investigation consisted of 65 participatory qualitative interviews, conducted over multiple visits to households over the course of a two-year period between July 2022 and February 2024 (see Appendix A). These interviews represent a complete sample of the 72 biogas installations, with the discrepancy consisting of households which had been abandoned or changed hands and where the original owners were either deceased or untraceable. Ultimately, we were able to visit each of the 72 sites, but only 65 interviews with owners were possible at the time of the fieldwork. Interviews were loosely structured, with a narrative focus, to allow the respondents to tell their stories, and share their experiences with the project. Household interviews also included substantial participatory elements, with owners, particularly at households, allowing the researchers to join them throughout their daily routines, with an emphasis on the digester and their energy needs. In addition, we conducted 15 interviews with stakeholders relevant to the project, and Malawi's broader biogas and energy sector, including: representatives from UNDP and the Malawian MoE, a private biogas implementor company (not involved in this specific project), members of local government within the affected districts, and many of the agricultural extension officers who had been involved in the initial implementation (see Appendix B). Interviews were conducted in the local language (Chichewa),[5] audio recorded and transcribed into English. Participation was voluntary, and responses were recorded anonymously. Within this text, individual households have been assigned an Interview ID, to which they will be referred, and identifying information beyond the general location of the household (community or district) has been removed. Interview guides can be referred to in the appendix.[6]

All qualitative data were analysed using deductive thematic analysis.

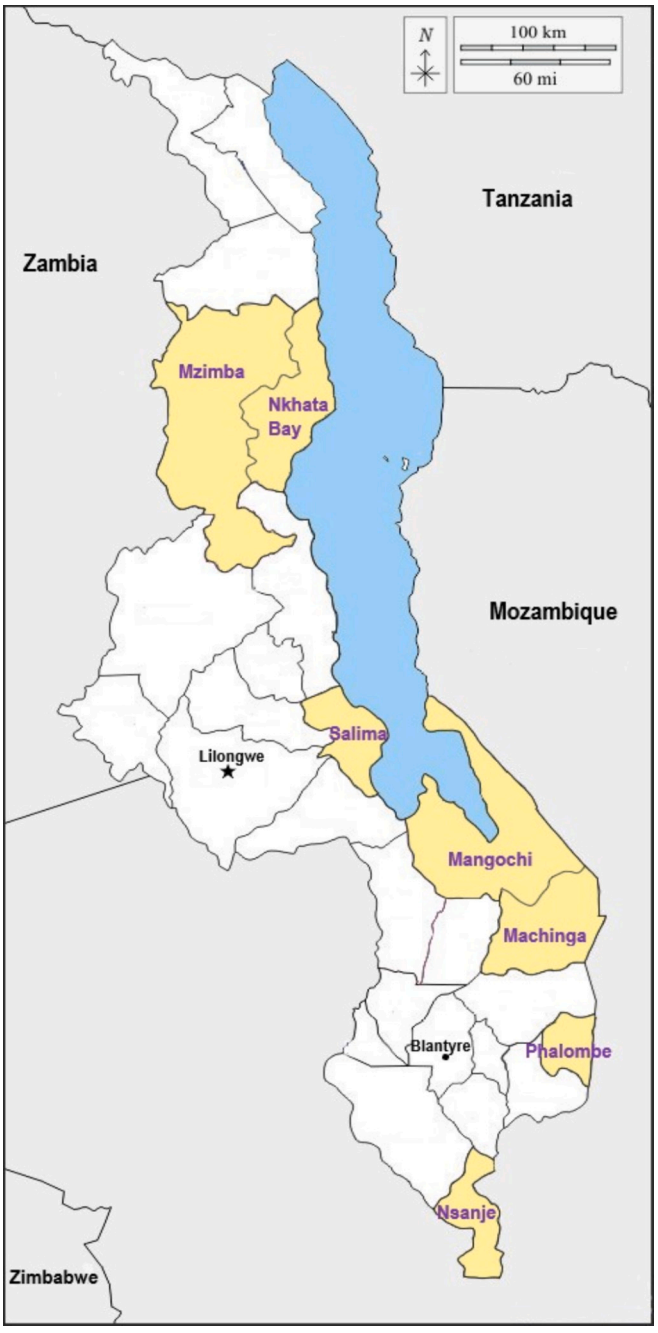

Fig. 1. Map of Malawi with Districts with beneficiary sites indicated.

Interview transcripts were stored and coded using NVivo, a software tool that supports systematic organisation and analysis of qualitative data. The coding process was guided by a set of predefined themes aligned with our three core research questions: (1) unpacking the original aims of the UNDP biogas project and how these were interpreted by both beneficiaries and stakeholders; (2) investigating the causes of project failure and exploring accountability within stakeholder arrangements; and (3) examining the repercussions of failure for beneficiaries, including the potential for reparations and the responsibilities of implementing bodies. While the overall structure of the analysis was deductive, we remained open to emergent sub-themes that added depth and nuance to these overarching categories. For instance, themes relating to beneficiaries' perceptions of harm caused by the project were not pre-identified but emerged inductively during the analysis and are presented in the Findings under their own thematic headings. This study

[4] Northern, Central, Southern.

[5] Some key stakeholder interviews were conducted in English.

[6] Some of the beneficiary interviews have been anonymised and published as part of an open-access dataset by Schöbitz et al. [24]. Please note that this dataset does not represent the full set of interviews used in the present study, but was compiled for a separate analysis currently under review by Kalina et al. [25].

received ethical approval from Malawi's National Committee on Research in the Social Sciences and Humanities, Protocol No. P.03/21/560.

5. Results and discussion

5.1. Project objectives and causes of project failure

5.1.1. Perspectives on project objectives

As previously described, the digesters were rolled out as part of a broader UNDP-funded Sustainable Energy Management (SEM) project, which sought to pilot innovative renewable energy technologies over its four-year span [26]. However, interviews revealed that the tarpaulin digesters were only introduced in the third year of the project as a secondary effort to achieve the project's goals. Previously, the MoE, which was in charge of project implementation with UNDP as the donor, had attempted to implement biogas systems using cheaper materials in the same households but they had never worked. Under the SEM the biogas digesters were rolled out concurrently with solar home systems and briquette-making technologies. Agricultural extension workers who were 'trained' to support the biogas beneficiaries noted that their brief training covered not just biogas, but also solar technology and briquette production, indicating a broad, rather than biogas-focused, training approach. Government officials interviewed maintained that they "did not impose [biogas] on them",[7] emphasising that the choice of technology was not dictated from the top down. Instead, they stated that Village Development Committees and Area Development Committees were presented with a range of options and made their own selections. From the interviews, it was unclear who specifically chose biogas for these households. Importantly, the beneficiaries themselves were not involved in this decision—they were largely unfamiliar with biogas until they were informed they would be receiving the systems.

Some stakeholders suggested that, "If they [the beneficiaries] are aware of other technologies, such as solar, I think most people would choose solar technology because it's simpler for them".[8] This situation suggests that while the decisions may not have been made by the MoE, the selection process at the local level for the technology and who the beneficiaries would be was top-down. After the first biogas systems failed, it was a UNDP official who decided to reintroduce biogas technology for a second time, despite the availability of alternative technologies that could have been considered. This decision underscores the persistent top-down approach in technology implementation within the project.

The beneficiaries were not aware the project was a pilot project, and they engaged with it as if it was a serious project that would bring them benefits. Some beneficiaries were even told that they would not only be able to cook on biogas but likely be able to generate electricity and charge their phones. The messaging they received from project actors did not reflect the project pilot nature nor did it seek to manage their expectations. This disconnect is compounded by the fact that the interviews with the beneficiaries revealed that they live precarious livelihoods, emphasising their potential to benefit significantly from effective and contextually appropriate interventions—whether technological or otherwise—to enhance their livelihood security. Many households described how finding firewood for cooking is labour intensive, stressful, sometimes dangerous and for some even involves long hours or walking to cross the border into Mozambique. In some of the sites cutting down firewood for cooking is criminalised, forest officials patrol local forests and punish people collecting or buying wood and charcoal, as the following Phalombe households, located near the Mozambican border, articulate:

> *The forest officials have made it perfectly clear that there is no wood in the mountains, so when they find you in the mountains, they shoot your leg, and if you resist arrest or try to run, they shoot to kill. So, firewood is very scarce…. if we want to cook, we use the wood from Mozambique and it's very expensive.*[9]

> *Sometimes we even go to Mozambique to get firewood…. we leave as early as 3 in the morning, and if we go around that time, we get home at the 1 or 2 PM.*[10]

5.1.2. Causes of project failure

As described in the initial Mzuzu report, out of the 72 biogas digesters installed, only a handful managed to function for a year or longer, with most failing after just a few weeks or months. Alarmingly, many of the digesters barely operated for a few days or never worked at all. During our visits, we found that several digesters had been dismantled and repurposed: pipes were being used as washing lines, and the bags were repurposed as roofing for chicken coops (see Fig. 2). Some beneficiaries, wary that someone might return and hold them accountable, had carefully stored the disassembled parts away. Importantly at the time of the interviews none of the biogas digesters were functional (see Fig. 3).

Interviews with beneficiaries highlighted challenges which have already been articulated within the Mzuzu report: poor selection of beneficiaries with adequate feedstock, lack of training of beneficiaries and agricultural extension workers, no follow-up services, poor technology and installation, lack of commitment from beneficiaries and beneficiaries not feeding or operating digesters properly [1]. These reasons for failure closely mirror common barriers articulated within the literature on domestic biogas projects [27–31], including a recent study from Malawi, which identifies key barriers to biogas adoption such as high installation and maintenance costs, limited feedstock, poor dissemination strategies, inadequate training and after-sales support, unreliable water access, weak institutional coordination, lack of standards, and socio-cultural constraints [32].

However, although these challenges were real, they will not be further discussed as we contend that these are both well understood barriers within domestic biogas programmes, but more importantly, symptoms of higher-up systemic failures related to project governance that this article is focussed on [3].

The project was also marred by severe disorganisation and unclear leadership, leading to its rushed and chaotic execution. For instance, the UNDP stakeholder we interviewed, involved in the biogas project, realised that after three years, there were no tangible outcomes to show for their investment. In a rush to demonstrate concrete results, the implementation of the tarpaulin biogas digesters was expedited. This hasty process meant that the SEM project concluded shortly after the digesters were installed, leaving no resources for post-installation support.

> *It was a 4-year project, and I came during the 3rd year of that project. Then I started asking the team here what we can show that this project has done after 4 years. At that particular time there was none - nothing on the ground…Then I was worried that I have come towards the end of the project but still I will need to write a report of the project…Then came the idea of tubular biogas but we had to do it fast because the project was coming to an end.*[11]

Upon reflection, stakeholders acknowledged that the project was rushed, and that they should have conducted a pilot project to test the digesters and gain necessary expertise before installing them in remote

[7] SH04.
[8] SH03.
[9] HH52.
[10] HH46.
[11] SH01.

Fig. 2. A) a beneficiary has repurposed their biogas digester as a roof for their chicken coup, B) a beneficiary has repurposed their biogas digester as a door.

Fig. 3. A collage of ruined digesters from households within the case study.

rural households. This missed critical step meant that no stakeholder involved, including the installers who other stakeholders said also seemed like they were learning on the job, could be considered biogas experts. Furthermore, the MoE, tasked with educating agricultural extension workers about biogas, admitted to having no prior experience themselves, learning alongside those they were training.

That was our case of the technology – we didn't have time to do an assessment before deploying it out. So, with biogas you need to select pilot centres with different characteristics, run demonstrations and be happy that this can really work. As a result, when deploying you should be able to say look, we did this, and it worked.[12]

Furthermore, there was confusion among stakeholders about who was in charge and their specific responsibilities. The training provided to extension workers—who were supposed to support the beneficiaries—and the beneficiaries themselves was cursory, covering only basic operational procedures, as one agricultural extension worker described:

We didn't know that digesters are hard to manage and that one needs a comprehensive understanding to manage them. So, at first, we didn't think us participants needed skills to manage digesters. We thought that once they installed the digesters it would be smooth sailing. We didn't think that after installation they would malfunction after only a week. So, I can say there was no leadership - they didn't pass knowledge, responsibilities, or delegated powers to us.[13]

Furthermore, there was no plan for post-implementation support. Both beneficiaries and extension workers were left with contact numbers for government officials and biogas installers who had no remaining funds and considered the project concluded, as this exchange with a MoE official illustrates:

Respondent: And that time when we were implementing that project, I had to leave for school. That means my phone was unavailable. So, all those two years I was out they were trying my number but it was offline. So, you see those were the challenges.
Interviewer: I'm thinking that you have an office. Why didn't you do proper handovers with your colleagues there?
Respondent: There was another challenge: the beneficiaries call you [*from*] *6 different numbers, changing to a different number every day. So it's difficult to know what number to call* [*them back on*].[14]

Biogas initiatives require long-term commitment, including training and post-installation monitoring [16,33]. Introducing this complex, labour-intensive technology without ongoing support is highly prone to failure. Such an oversight by the UNDP, an international organisation with extensive experience in development aid and more specifically energy services including domestic biogas implementation, is careless [34]. Although biogas is relatively new to Malawi and many local actors are inexperienced — and despite one study highlighting the absence of supportive policies and a conducive regulatory environment for biogas in the country [32] — it is concerning that this project proceeded as it did, given UNDP's extensive knowledge in the field and the well-established best practices in biogas implementation that have developed within the sector [34,35]. Moreover, the private biogas implementer (not involved in the UNDP project) we interviewed, who has installed a number of successful projects, also expressed deep frustration with the way aid-funded projects often implement biogas poorly in Malawi — prioritising timelines and budgets over user needs. This stakeholder is not only experienced but also has clear ideas for how biogas can and should be implemented more effectively in the country.

The government should be strict in ensuring that equipment being offered on the market is of good quality… The government needs to set standards of service that should be provided to the end-user… [*and ensure that competent installers are selected for contracts*].[15]

Project stakeholders had access to both global and local knowledge and resources, yet these were largely overlooked during the implementation of this UNDP project. This investigation highlights a clear lack of organisational and cross-country learning within UNDP and underscores the MoE's's inability to effectively implement local biogas projects or challenge UNDP's decision-making, which rushed the implementation of a technology that the MoE was not equipped to handle.

Finally, during interviews with agricultural extension workers and the UNDP stakeholder, indications emerged that the project was compromised by corruption and nepotism in two distinct areas. Firstly, the selection of the contractor for biogas installation raised concerns. The chosen contractor was relatively inexperienced with biogas technologies and was based far from the implementation sites, complicating follow-up efforts. This selection was questionable, particularly as the contractor later demanded additional funds towards the end of the project, claims considered unjustified by the UNDP stakeholder. Despite reservations, payments were made under pressure from undisclosed influential connections, suggested to be governmental ties, to smooth over tensions. Secondly, at the local level, beneficiary selection was reportedly influenced by nepotism, resulting in many inappropriate households being chosen—specifically, those without adequate cattle. It is challenging to determine the exact impact of this poor selection on the project's outcomes because the mismanagement and poor execution suggest that failure was inevitable no matter the household. This is evidenced by the fact that all installations failed, regardless of whether households had sufficient cattle or not.

This analysis suggests that the project was overly technocentric, prioritising the rapid installation of technology and relying heavily on external knowledge (*technē*). It completely overlooked the views and capacities of beneficiaries, lacked proper training and monitoring, and failed to engage with local politics and social processes (*mētis*). The fact that international aid tends to benefit local elites, a pattern well-documented in the literature [8,36–39], means that the issues of nepotism and non-compliance with set criteria discussed by the UNDP actor should not have been surprising. Historical awareness of nepotism and corruption in aid should have prompted more proactive measures to mitigate their impact in this project. However, the lack of initiative and leadership resulted in merely categorising these issues as challenges, with no one taking responsibility for anticipating or addressing them. International aid has long been criticized for assuming that technology is neutral and overlooking how it can be politically manipulated, as well as for failing to effectively incorporate local political dynamics into project planning [7,8]. This case study clearly shows that *technē* remains a cultural problem within modern aid projects and that a cultural shift towards approaching these projects with more *mētis* is far from being realised.

5.2. Beneficiary investment and harm

5.2.1. Resources invested

Beneficiaries contributed significant resources, both in materials and labour, towards the implementation of their systems. For instance, all beneficiaries were required to excavate pits for the biogas digesters, and theoretically, they were also supposed to line these pits with cement and brick [1]. However, interviews revealed that this step was often not communicated effectively, or simply not executed by some beneficiaries for various reasons. As a result, while every beneficiary dug a pit, only a subset completed the lining with brick or cement. Moreover, the beneficiaries were responsible for preparing the initial mixture of cattle dung and water necessary to activate the digester and for its daily maintenance to ensure continued operation. The level of resource investment varied significantly among beneficiaries, influenced by factors such as their ability to dig and line the pit, physical capabilities, household size, number of cattle owned, and proximity to a water source which impacted whether they hired people to help with these tasks or not. Despite these variations, all beneficiaries contributed in some way to the

[12] SH01.
[13] SH10.
[14] SH04.
[15] SH02.

preparation process. Some beneficiaries also hired help to dismantle the digesters when they ceased functioning. A summary of labour and resources that the beneficiaries invested has been summarised in Table 1.

It is also clear that many lack resources and what they invested into the biogas project was not inconsequential. Additionally, some beneficiaries voiced that they have limited agency to engage in legal processes, or trust in the state's protection, making them feel vulnerable and powerless to do anything about this failed project they invested into.

5.2.2. Harm experienced

After investing precious resources into their systems, beneficiaries expressed significant distress over perceived harm from the project, with respondents describe feelings of shame, betrayal, and having been taken advantage of by project implementers. Many retrospectively viewed the initiative as only an experimental project, implemented by inexperienced individuals lacking genuine commitment to the project. Initially unaware that the project was an experiment, the beneficiaries engaged earnestly, investing their time, money, labour, and hope in the biogas technology. As outlined in Section 5.2.1 many beneficiaries lacked disposable resources, making the losses particularly impactful. Table 2 presents the key themes of harm identified during the analysis, highlighting the most common issues raised by the beneficiaries.

Opinions among stakeholders varied regarding whether the project had harmed the beneficiaries. While some acknowledged the detrimental impact of the project, others believed the harm was either minimal or non-existent. Local agricultural extension workers tended to be more empathetic towards the beneficiaries, with the majority recognising that the project had caused harm. However, there were still a few who viewed the project's impact as negligible.

> *The biogas implementers were supposed to come to monitor the beneficiaries. But they never came. So, it's like we put a burden on the poor farmers who had no experience with the technology and didn't know what to do…It was unjust to them.*[16]

> *For me, wasting money or spending money on your own initiatives is not a problem. I don't perceive it as an issue because to reap benefits from any project or development, you need to invest…So, I can't accept this notion of wasting money. Also, I don't believe they* [*the beneficiaries*] *wasted their time because, in some cases, it was their responsibility to utilize the technology.*[17]

Stakeholders from UNDP and the MoE downplayed the harm done to beneficiaries. The UNDP stakeholder and some of the MoE stakeholders deemed the harm acceptable since they, as project workers, had also put in effort and faced losses even though they had not, like the beneficiaries, invested personal resources but efforts as part of their salaried jobs. While stakeholders often framed the project's shortcomings with an "all in it together" sentiment, acknowledging that although beneficiaries experienced losses, so too did implementing agencies, this narrative of shared loss was not reflected in the accounts of the beneficiaries themselves. Instead, beneficiaries expressed a clear sense of having been wronged, highlighting an imbalance in power and accountability that was obscured by the language of collective failure. The MoE stakeholders were also suspicious of the user's complaints. They suggested that beneficiaries could complain now, but if we had observed them immediately after implementation, we would have found them neglecting the digesters.

Table 1
Summary of labour and resources beneficiaries invested.

Broad investment category	Specific investment	Description	Quote
Labour and resources beneficiaries invested	Financial investment	Beneficiaries faced various costs for installing and operating biogas digesters, such as buying materials (cement, brick), paying for labour for digging and lining the pits, and gathering cattle dung and water. They also incurred communication expenses like airtime for contacting installers. Many invested in these digesters expecting long-term savings on firewood, but when the digesters failed, they ended up spending money without the expected benefits	*We expected the digester to be beneficial and to change our daily lives. Little did we know that we would end up losing money. And, the money we lost was enough for us to use for 3 months to buy basic necessities, and it was not budgeted for that. We only spent the money because we expected to use it for 5 years. So, at the end, the whole thing saddened us* (HH52) *They left us their phone numbers, so that we could notify them on any issue, but the numbers couldn't be reached. We called, but they never responded. We tried both lines, Airtel and TNM, but never got a response. So that a negative because we were forced to buy airtime at a time we didn't really want to buy airtime, and even had little money.* (HH63)
	Labour	Beneficiaries, their households (including children), and/or paid labour were responsible for digging and lining the pits, collecting cattle dung and water, and mixing the dung with water.	*Respondent: I dug a hole with my children.* *Interviewer: How many children?* *Respondent: Two children.* *Interviewer: How long did it take you to dig the hole?* *Respondent: It took us two days, as you know the bag was huge.* (HH65)

5.3. Accountability and reimbursement

5.3.1. Learning and accountability

Accountability is the allocation, acceptance and demonstration of responsibility for actions and decisions [40,41]. It implies that some actors have the right to hold other actors to a set of standards and to impose sanctions if they determine that standards have not been met [42]. Accountability is both a precondition for, and outcome of, good governance [40]. Unpicking accountability in this project is challenging, as interview accounts inherently reflect personal perceptions, leading to multiple, sometimes conflicting, versions of events. This is further complicated by the project's disorganisation and the absence of any shared understanding of stakeholders' specific roles and responsibilities. However, the data raises critical questions that will be explored in this section: Why did an international organisation with extensive biogas experience implement the project so poorly? How can any stakeholder shift blame onto the beneficiaries? Who, ultimately, should be held accountable for this failure? And how does this project align with or challenge existing development critiques?

Firstly, no stakeholder assumed full accountability as a leader might.

[16] SH12.
[17] SH11.

Table 2
Summary of harm experienced from the perspective of the beneficiaries.

Broad harm category	Specific harm category	Description	Quote
Harm experienced and described by the beneficiaries	Broken trust	Beneficiaries initially trusted that the implementers were knowledgeable and committed to the project. However, when the digesters failed, many realised that the implementers might have been negligent or lacked expertise. This led to feelings of betrayal among the beneficiaries.	*First, they came to learn from us. The installers saw this working somewhere but did not ask about its technicalities or fully understand its technicalities. They just looked at it at face value. But the problem is that when they came we thought they were experts and were going to help us. They failed because they are learners. Or, it failed because they did not want to fix it.* (HH38) *Since it was our first time to see and use it, we simply accepted and acknowledged what they told us. We did not feel or know if the information was wrong or inadequate - We trusted them. They were like our teachers – and you do not doubt or question your teacher* (HH27)
	Anger	Beneficiaries feel angry about being lied to and made to feel powerless. They had hoped for an improved life, but those hopes were never realised.	*I have anger in my heart. If the government was a person, I would have grabbed him by the neck to give back my money to use it for cooking….* (HH38)
	Felt taken advantage of	Beneficiaries were asked to sign papers and have photos taken.	*They were only coming here to take pics and then go* (HH58) *After feeding the digester, the bag got full. Then, after some days, they came, and I recall they asked us to switch on the stove after they showed us how to. Afterwards, they took pictures, videos, and left.* (HH45) *They said they were going to come with solar panels to supplement biogas. Then, they got in their cars and picked papers for us to sign. So, we signed and since then they have never come back.* (HH45)
	Made to wait, lied to	Beneficiaries were misled about the after-sales support they would receive. Project workers initially promised ongoing assistance but failed to follow through. They neither returned to help as promised nor provided updates on their availability.	*They simply advised us to inform them on any malfunction. So when it malfunctioned the first time I called them and they told me they would come. But when I called the second time to follow up I was told that it was wrong number.* (HH58) ***Beneficiary:*** *They said they would bring solar panels to boost the efficiency of the digester.* ***Interviewer:*** *Why all these broken promises?* ***Beneficiary:*** *They did not know how to fix it, and I believe they only talked about solar to ease our hearts. They knew that they would not come with the solar system.* (HH57)
	Helpless, self-blame	Some beneficiaries felt helpless when the digesters malfunctioned because they lacked the knowledge to repair them. Many, not understanding why the digesters failed, ended up blaming themselves.	*We felt confident that we would run and operate it. But, after problems started, we realised there was nothing we knew to remedy the problem. We were helpless. So once we had a problem, that time, we just abandoned it.* (HH41) *It would be improper for me to say it can't work… I also don't know what went wrong. Maybe, I did something wrong; maybe they didn't install it properly.* (HH29)
	Shame	Some beneficiaries faced ridicule and negative comments from neighbours for participating in the biogas project. When the digesters failed to function as promised, these individuals experienced shame and humiliation, with some community members mocking their efforts.	*It only brought shame on this household!* (HH37)
	Felt a power imbalance-injustice	Beneficiaries felt poorly treated and disrespected by the project workers, who did not see them as legitimate stakeholders. This perception of inferior treatment led to feelings of alienation and dissatisfaction with the project's management.	*It was fraud. They only came here to cheat people and it was easy for them to do that because the people here are illiterate, and that's why we just accept and applaud everything! The fact that we had no lawyers, and that we didn't have the money to hire lawyers is why we did not go to sue for what they did.* (HH56) *They came with the handover papers. So we thought that they came to fix it but that was not the case. They just came so that we could sign the papers.* (HH38)
	Lost out on other projects	Lost out on benefits from other projects because of the biogas project.	*People received food packages, money and other assorted items when there was hunger, but that time our names were not considered because they said we had already benefited from biogas.* (HH37) *The sad part about the digester was that around that time, there were some other community projects, for example, there was a road project and a social cash transfer program, but the community leaders decided not to involve us in the projects because we were involved in the biogas project.* (HH44)

Some stakeholders did acknowledge responsibility for specific aspects of the project's shortcomings although most found reasons to avoid taking responsibility. For instance, the MoE stakeholder quoted above, when questioned about not providing alternative contact numbers for beneficiaries when they left for school, dismissed the issue by stating the challenge of being contacted from multiple numbers by each beneficiary, evading direct responsibility. Stakeholders involved in the project were unsure of who 'owned' the project or who was in charge. This confusion among stakeholders about their roles and responsibilities suggests a lack of clear communication and defined leadership within the project. If roles had been clearly delineated and a transparent chain of command established, it might have been easier to identify who was accountable for the various shortcomings. The private biogas implementer also noted that aid projects often fall back on the excuse that "*the project has phased out*"[18] using the end of funding cycles to justify a lack of sustained support or accountability. The way aid financing is structured — with strict timelines, fixed deliverables, and limited flexibility creates systemic opportunities for avoiding accountability.

Furthermore, both the MoE and UNDP framed the project primarily as a learning experience with the UNDP stakeholder going as far as saying there is no failure at UNDP only learning experiences. This stance allowed them to diminish the significance of the project's failure and, consequently, their own accountability.

> *Interviewer: So what did you do after that report?*
> *Respondent: We did nothing as the project was coming to an end, and we had exhausted the funds for that project. I think that time we had another project about mini-grids. So, we could not get funds from that project and divert it to the biogas project. If I had done that even the steering committee would have questioned my actions as you cannot just move project funds anyhow.*[19]

During our analysis, it became clear that there was a notable absence of discussion around the accountability of UNDP for the project's failures. Interestingly, the beneficiaries, who were unaware that the donor was UNDP, expressed concern for 'the donor's' investment, regretting that the funds had been wasted by other stakeholders. This sentiment was supported by the responses from the UNDP stakeholder, who appeared happy to be an invisible stakeholder:

> *First and foremost, UNDP was not the implementer of the project. We funded the project. The project implementer was the Government of Malawi…And if you ask people, they will tell you that they saw government vehicles. So, people know that the Government of Malawi was involved so we are very happy with that.*[20]

Given UNDP's experience with international development projects and specifically domestic biogas [34], the absence of accountability for the project's poor execution is troubling. This oversight likely stems from the complex interplay of aid culture and the relationships between donors and recipients, which often position the funding organisation favourably due to its control over financial resources [3,11].

In the current system, donor agencies are primarily accountable to their own parliaments and domestic interest groups, rather than to the beneficiaries in recipient countries. This misalignment in accountability is a key factor contributing to ineffective aid programmes [43,44]. Interviews revealed that no stakeholder felt accountable to the beneficiaries. UNDP's primary concern was having substantial content for their reports, while the MoE's accountability was directed towards UNDP. This was emphasised by UNDP's decision to move their offices into the MoE.

> *After the SEM project… that is when* [*we decided we should move*] *our officers into the ministry to try to enhance accountability.*[21]

While the project failed for the beneficiaries—who were clearly never a priority stakeholder—what did it ultimately achieve? While the relocation of UNDP offices into the government might be seen as a result of the learning process, it did little to address the lack of accountability towards the beneficiaries. This outcome also highlights a significant power dynamic that warrants critical scrutiny, as it raises questions about who truly holds decision-making power in such projects between international organisations and national governments. The MoE's acceptance of project funding, despite its shortcomings, and its subsequent relationship with UNDP require further analysis to understand how power, accountability, and responsibility were negotiated in this context.

Finally, many stakeholders underestimated the difficulty of operating biogas technology, and the extent of long-term support and training that users needed. Some admitted they were new to biogas technology and that it failed because they were learning on the job. We conclude that some stakeholders still fail to grasp the complexities of biogas operation and what it takes to implement a successful biogas project. The underestimation of what it takes to implement a successful biogas project resulted in further blame shifting. For instance, MoE stakeholders blamed the beneficiaries for accepting a technology they could not manage, removing responsibility from the project stakeholders, as shown in the following quotes:

> *But I still feel we left them at a level they could have still managed to handle the digesters. We commissioned and we handed over, so it was their thing. For us, it was only to monitor those things. But once a project closes, you don't monitor anymore.*[22]

> *Uh, no. No, because like I said, it's not the ministry that got this thing wrong. Even the beneficiaries have a part to play. It's only sad that you met beneficiaries after all the digesters failed. If you had gone there after installation, you could see that some beneficiaries were not feeding the digesters. But now, they can say whatever and not point fingers at themselves and there is no evidence. Honestly, I feel the ministry did try to help the people. The people too had responsibilities to look after the digesters by feeding it. So, I can't say it's unfair to them. Those things cost money, we gave them, and it's only sad that things didn't work. The ministry had good intentions for them.*[23]

The project was flawed in its design and execution, and attributing its failure to the beneficiaries shows a clear misunderstanding of what is needed for a successful biogas initiative [16,33]. These experts promised the beneficiaries that biogas would eliminate the need for wood collection, and some beneficiaries were even told they would be able to generate electricity, presenting it as a fool proof solution. There was a striking lack of accountability throughout the project, with poorly executed work being routinely accepted without repercussions, underscoring a systemic failure to uphold standards or address deficiencies effectively. None of the project stakeholders in this UNDP project relied on good outcomes for their continued employment or organisational success — in contrast to the private biogas installer, who explained, "we are accountable to our users… we recognize that to grow our business and company, we must ensure accountability in what we provide to [our customers]" This comparison underscores a deeper issue: the way aid projects are typically structured means there is little incentive for accountability, and no long-term funding or planning mechanisms to support it, even if stakeholders are well-intentioned.

[18] SH02.
[19] SH01.
[20] SH01.
[21] SH01.
[22] SH04.
[23] SH03.

5.3.2. Harm and reimbursement

Acknowledging whether harm had been done to beneficiaries and if they should be reimbursed proved to be complex and contentious topics for stakeholders to grapple with. Throughout these discussions, stakeholders not only contradicted each other but also often contradicted themselves. These inconsistencies underscore a significant gap in protocol within a level of project hierarchy in the entire international aid sector, within the UNDP, its Malawi office, or the MoE. There appears to be no established protocol for determining when harm has been done and when and how to execute such compensation. This ambiguity suggests that the issue of reimbursement is not institutionalised within project policies. Thus, grappling with topics such as fairness and reimbursement is left to individual stakeholders to personally navigate which brings in personal ethical dilemmas and confusion. On the other side, for us as researchers even after analysing all the interviews, assigning accountability for the biogas project remains unclear and complex. Attributing blame solely to individual stakeholders is problematic when their actions are heavily influenced by organisational culture and institutional frameworks. Can a UNDP stakeholder truly be held responsible when, despite the institution's experience, they lacked the necessary knowledge for success? Similarly, should government workers be faulted for pursuing a biogas project when their accountability is directed more towards the UNDP than towards the actual beneficiaries?

Stakeholder opinions on reimbursement largely mirrored their views on harm done. Extension workers, who perceived the most harm to beneficiaries, were generally more supportive of reimbursement although not all agreed it was appropriate. Some extension workers felt reimbursement would reinforce a charity mindset in the beneficiaries, while others believed that providing another technology or proper training on biogas would be a more suitable acknowledgment of the harm done. Although MoE stakeholders were hesitant to admit harm was done, one did suggest that if the project was a pilot and the beneficiaries effectively participated in a learning process, reimbursement might be warranted.

Discussions on reimbursement suggest that the concept remains underdeveloped because beneficiaries are not viewed as clients with the power to demand accountability. It was evident from stakeholder interviews that this project was not designed with the beneficiaries in mind; they were not considered active stakeholders, and accountability was directed towards other stakeholders and review boards rather than the beneficiaries:

> *If funds are available, then it's the right thing to do because some people wasted resources and time, and even made feedstock when they were trying to revamp it. Thus, if the project design allowed for this, then reimbursement can be considered. If funds are not available, that's also acceptable. In Malawi, people are accustomed to working for nothing.*[24]

> *Most of these people, what they contributed is mostly labour. That's all. So how can you compensate for labour? It was their own thing, and it was going to benefit them, so why should one reimburse them?*[25]

Furthermore, the UNDP stakeholder made it clear that beneficiaries were seen as passive recipients, and their lack of power was both acknowledged and accepted:

> *Reimburse? No - that cannot happen. You just can't do that. You can't reimburse on a development aid project. Even if the beneficiaries can go to court to sue the implementers, they can never win that case. The beneficiaries invested their time and resources, and we also invested in that project. We both lost. The beneficiaries lost their resources, and we lost resources too. You can't reimburse beneficiaries; they are not clients. They are beneficiaries. What does it mean to be a beneficiary? It means you were gifted something.*[26]

These quotes highlight the significant ethical concerns within the project's approach, revealing a problematic culture where beneficiaries are seen as passive recipients of aid rather than active stakeholders. This perspective suggests that beneficiaries should be grateful regardless of the project's outcome, normalising their lack of power. More troubling is the comparison between the losses suffered by beneficiaries—often deeply impactful to their daily lives—and the professional setbacks experienced by salaried UNDP employees. This comparison is not only unfair but also underscores a disconnect between the project's administration and the real-life consequences for those it was supposed to help. Such disparities in perceptions of loss and accountability point to broader issues of equity and respect within aid projects, raising critical questions about the ethics of implementation and donor agency responsibility to the people they are intended to serve.

This sentiment was not shared by all interviewees, the private biogas implementor (not involved with the UNDP project) thought that the beneficiaries should be reimbursed.

> *Yeah,* [*the beneficiaries should have been reimbursed*]. *For example, if you go buy a laptop, they give you a receipt and there is a warranty. If the thing doesn't work, they say you can return it. That's what happens in business, that's what's normal. A month??* [*referring to some biogas digesters only working a month in the UNDP project*] *And we are talking about a technology we say can last for 20 years? They have to reimburse!.*[27]

As Ferguson [8] argues in his Epilogue of *The Anti-Politics Machine*, poverty is fundamentally a result of powerlessness. Instead of technocentric, top-down interventions that suggest people can be "lifted" from poverty through external, state-controlled mechanisms—thus maintaining existing power hierarchies—projects should focus on empowering those in need of power. In the case of this biogas project, it is evident from all interviews that empowerment of the beneficiaries was not a project priority. Both the UNDP and MoE fully or partially blamed the users for the project's failure, and UNDP explicitly emphasised that these users were meant to remain powerless, without the capacity to demand accountability or influence outcomes in their own project. This passive role of beneficiaries reinforces the entrenched power structures that development projects, in theory, should aim to dismantle. This raises critical questions about why users are being blamed for the project's collapse, especially when it was evidently mismanaged. Where does this culture of blaming users, who were treated not as stakeholders but as passive recipients, originate? Meanwhile, the organisations responsible for the project's failure appear to evade accountability.

6. Conclusion and recommendations

Biogas projects face several commonly cited barriers which have overall contributed to many poor outcomes globally. However, although these barriers may be contributing factors, we contend that they are merely symptoms of structural issues related to project governance and accountability, which resonate throughout the broader development sector. The purpose of this investigation was to closely examine one aid-funded biogas provision, 72 tarpaulin-based biogas digesters funded by UNDP across seven districts in Malawi, and to provide a more nuanced assessment of how, such a large, and high-profile investment, can fail so spectacularly. This study starkly reveals that the Mzuzu University report, commissioned by UNDP, focuses primarily on the symptoms of the failure rather than the governance and decision-making processes that led to failure. It omits key details, such as the rushed

[24] SH08.
[25] SH04.
[26] SH01.
[27] SH02.

implementation before funding expired, the suspected corruption and poor selection of a biogas implementer and sheer lack of knowledge on domestic biogas of all stakeholders involved in project development and the fact that beneficiaries were left powerless to enact change in their own development project. These causes for project failure that were left out of the report, prevent UNDP, and wider stakeholders in Malawi, from fully learning from the project. Moreover, poorly executed initiatives like this UNDP one damage the broader reputation of biogas in Malawi and create a hostile environment for legitimate actors who are working to deliver high-quality, user-focused systems. Without critical post-project reviews such as this, meaningful improvement and accountability will remain difficult. In addition, our findings show that long-standing critiques of development aid—specifically its lack of critical self-reflection—are still rampant in the sector [7,42,44]. The biogas initiative was undermined by the very issues that development scholars have critiqued since the early days of development aid—top-down approaches, technocentric solutions, and a lack of engagement with local realities [7,8]. These same reductive assumptions continue to hinder progress, revealing that organisations and states are not only failing to learn from contemporary mistakes but also neglecting to reflect on long-standing critiques of development itself. The Mzuzu report to the UNDP shows that it is still acceptable to overlook the governance and decision making of the project actors and that UNDP lacks critical self-reflection. We specifically advocate that this study should not result in blaming specific actors involved in the project or lead to any negative consequences for their employment. Our assessment and analysis of accountability clearly show that poor decision-making in this project is difficult to assign to individuals. Instead, it reflects longstanding critiques of aid, stemming from an internalised culture perpetuated by a lack of critical self-reflection. The individuals involved in this project are merely reflections of this system. Nonetheless, this begs a deeper question: is there a vested interest in maintaining power dynamics and sustaining the status quo, even if it means repeating failures?

Finally, we must draw attention to the complicity of some academic research. While cooking practices are among the most extensively studied energy service areas, often research has been found to overly focus on the user level, as the Mzuzu report did. This narrow focus means that many studies fail to incorporate analysis of systemic factors, such as governance and policy, likely missing the root-causes of project failure [45]. This research gap and misdirected focus have been noted by a growing number of authors, including Bharadwaj et al. [45], Abdelnour, Pemberton-Pigott, and Deichmann [46], Batchelor, Brown, Leary, Scott, and Leach [47], and Khandelwal et al. [48]. This study is one of the few that looks further up the project chain to identify the root-causes of failure so that project weaknesses can be critically engaged with. It adds to findings, such as those from Sovacool [49], Boamah and Rothfuß [50], that successful energy projects are not only about technological innovations, financial considerations or household decision making, but are also to do with contextual and programmatic factors such as governance, policy, markets, and commitment from project actors. We advocate for a shift in research direction, combining household studies with higher-level analysis of the programmatic and governance environment. Additionally, there should be critical self-reflection within the research community to understand why there has been an over-emphasis on the household level, allowing programmatic failings to go unchecked and unfairly blaming households for failed development transitions [3]. The necessity to thoroughly document and analyse failures within international development aid projects is critical as it fosters learning and informs future project implementations [3,51–53]. Without a comprehensive understanding of why projects fail, projects risk repeating past mistakes, thereby perpetuating a cycle of inefficiency [51,53].

In conclusion, the discourse on aid funded biogas lacks critical examination of the fundamental design and governance of projects. This project highlights the urgent need for deeper investigations into the management and governance of biogas initiatives. The cultural tendency to blame users rather than donors or stakeholders must also be scrutinised to ensure accountability is properly assigned. Ultimately, this analysis underscores the importance of shifting from superficial explanations, such as lack of training or poor engagement, to a focus on the deeper, structural causes of failure. By doing so, we can contribute to a more nuanced and informed discussion on how to ensure the success of future biogas projects, together with a better understanding of when they should be called off and of development efforts more broadly.

CRediT authorship contribution statement

Natalie Boyd Williams: Writing – review & editing, Writing – original draft, Methodology, Formal analysis. **Marc Kalina:** Writing – review & editing, Writing – original draft, Supervision, Methodology, Data curation, Conceptualization. **Jonathan Kwangulero:** Methodology, Data curation, Conceptualization. **Elizabeth Tilley:** Writing – review & editing, Supervision, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.erss.2025.104223.

Data availability

Some of the beneficiary interviews have been anonymised and published aspart of an open-access dataset by Schöbitz et al. [24]. Please note that this dataset does not represent the full set of interviews used in the present study, but was compiled for a separate analysis currently under review by Kalina et al. [25]. Other interview data can be provided under request depending on ethical approval. The interview guides and list of participants can be found in the supplementary material.

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