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Doing Mixed Methods in Context: Fieldwork Frictions, Reflexivity and an Ethnography-Inspired Approach in Heat Stress Studies in Ghana

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Abstract

Mixed methods research is often portrayed as a straightforward, step-by-step procedure, yet this portrayal overlooks the real-world challenges of fieldwork and the ethical and responsive approaches needed to address them. This can leave novice researchers ill-prepared to navigate the realities of fieldwork. Drawing on fieldwork with smallholder farmers experiencing heat stress in Northern Ghana, this paper introduces "fieldwork frictions" to describe disruptions arising from farm activities, positionality and local uncertainties. Rather than treating these frictions as methodological failures, it argues that they are integral to the research process — actively shaping how knowledge is produced and challenging the assumed linearity of an explanatory sequential mixed-methods design. An ethnography-inspired approach demonstrates how engaging with these frictions can enhance the contextualisation of quantitative findings and deepen qualitative inquiry, better capturing field realities. Recognising these frictions also sheds light on power dynamics inherent in research with vulnerable smallholder farmers. The paper offers three practical methodological lessons for novice researchers: treat fieldwork frictions as opportunities for insight rather than obstacles; remain reflexive and flexible, adapting ethically as needed rather than adhering rigidly to the original blueprint; and, where possible, incorporate ethnography-inspired insights to enhance contextual sensitivity and integration across mixed methods. This approach enhances the rigour of mixed methods research by producing insights firmly grounded in a specific field context.

Keywords

mixed methods research, fieldwork frictions, reflexivity, ethnography-inspired approach, flexibility, Ghana

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1. Introduction

In this paper, I reflect on my experiences as a researcher conducting a study with vulnerable smallholder farmers in Northern Ghana, as part of my doctoral fieldwork. My doctoral research examines how rising temperatures, humidity, and heatwaves affect these farmers, focusing on risks to their well-being, the adaptive strategies they employ, and the structural barriers that shape their responses to climate-induced heat stress.

In recent years, heat stress — defined as the physiological strain resulting from exposure to high temperatures that exceed the body's capacity to maintain thermal balance — has become increasingly widespread (ILO, 2019, p. 17; Ioannou et al.,

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2022). Workers engaged in outdoor physical labour, including farmers, are particularly vulnerable, as heat exposure threatens their health, productivity, and livelihoods (El Khayat et al., 2022; Nyambe et al., 2025; Yengoh & Ardö, 2020). In sub-Saharan Africa (SSA), rising temperatures intersect with labour-intensive farming, limited adaptive capacity, and deep-rooted structural inequalities, making heat stress a critical yet unevenly experienced dimension of climate risk (Saeed et al., 2022). In Ghana, where smallholder agriculture remains central to rural livelihoods (Adzawla et al., 2022), understanding how farmers experience and respond to heat stress is therefore both crucial and timely. Such insights are essential for informing labour-sensitive adaptation policies and contributing to the achievement of the UN Sustainable Development Goals, particularly Goals 1, 2, 3, 8, and 13.

Empirical research on climate change and adaptation in SSA often employs mixed methods approaches to capture both quantifiable exposure and farmers' lived experiences of climate risks (Frimpong et al., 2020; Guodaar et al., 2017; Shibru et al., 2023). However, such studies often present research design and implementation as straightforward, methodologically coherent processes. Such framing can obscure the contextual, relational, and political complexities through which fieldwork unfolds in practice (Boer Cueva et al., 2024; Sultana, 2007). As Sultana (2007) indicates, fieldwork is inherently contextual, relational, embodied, and politicised, requiring ongoing negotiation of ethics, power, and positionality rather than compliance with institutional checklists or predefined procedures (p. 374). Similarly, Tsing (2005) reminds us that "friction is what happens when global connections are made," underscoring that research designs aren't straightforward; they often encounter resistance, require negotiation, and call for adaptation as they interact with distinct local contexts (p. 1). Despite this, the messy realities of fieldwork, including frictions and negotiations that shape knowledge production in rural settings, remain underreported in climate, labour, and adaptation research in SSA. This underreporting of frictions risks reproducing idealised accounts of research practice and leaves novice researchers — particularly those using mixed methods designs — underprepared for the iterative, negotiated, and context-dependent nature of field-based knowledge production.

This paper reflexively examines the mixed methods research process, foregrounding fieldwork frictions, contextual factors, and negotiations that actively shape fieldwork and knowledge production The study was initially conceived as an explanatory sequential mixed methods design, in which the household survey would be conducted first, with its preliminary findings informing follow-up semi-structured interviews (Creswell et al., 2003). I had not intended to conduct ethnography, understood as a research approach that involves prolonged immersion in participants' everyday lives through participant observation and informal engagement (Hammersley & Atkinson, 2019). That said, as fieldwork unfolded, emerging frictions required ongoing adjustments to research procedures. These adjustments encouraged a reflexive, ethnography-inspired engagement with the field, grounded in sustained time on farms, close attention to everyday farming routines, and informal interactions.

While I do not claim to have conducted formal ethnographic research, I kept a detailed fieldwork journal (field notes and reflexive memos) as part of my standard research practice. In conducting the research, I adapted to on-the-ground challenges by adopting a reflexive approach that examines how fieldwork frictions informed methodological and ethical decisions and shaped knowledge of co-production across research phases. Extending the analysis of fieldwork friction to date, this paper demonstrates how such moments can be analytically utilised within an explanatory sequential mixed-methods design, rather than treated as methodological drawbacks. In doing so, I demonstrate that mixed methods research is neither linear nor methodologically neutral in practice. I argue that explanatory sequential design can be strengthened by flexibly engaging with fieldwork frictions and by deliberately and ethically integrating ethnography-inspired, context-sensitive approaches into study design and interpretation. This advances methodological practice and offers practical guidance for novice mixed methods researchers, students, and research methods instructors (as textbooks often overlook field realities).

The rest of the paper is structured as follows. The next section introduces the concepts of fieldwork friction and reflexivity, situates the field, and examines research design as a mode of anticipation. I then reflect on pivotal experiences of friction encountered during fieldwork with smallholder farmers in Northern Ghana, before presenting reflexive practices, strategies adopted in response to frictions, and the value of an ethnography-inspired approach used in the study. The paper concludes with a discussion of methodological lessons and practical recommendations for researchers, as well as a contribution to mixed methods research.

2. Fieldwork Friction and Reflexivity

At its core, social science research resists isolation because the analysis of social relations, practices, and negotiated meanings is inseparable from engagement with real-world social contexts. Fieldwork is therefore central to social research inquiry (Krause & Szekely, 2020; Scheyvens & Storey, 2003). Historically, from its anthropological roots, 'going to the field' involved travelling to a foreign land, living among unfamiliar people, and producing 'objective' knowledge through a detached researcher stance (Forster, 2012, p. 14). On the contrary, McIntyre (2003, p. 283) conceptualises fieldwork as "a

multimethod research approach in which the researcher engages in an ongoing relationship with a group, community, or organisation to explore the complex social and cultural realities that mediate people's daily lives."

Although vital, fieldwork is rarely straightforward. Research encounters are often shaped by fieldwork frictions — moments of tension, misalignment, misunderstanding, constraint, or interruption that arise when research designs, methods, participants, and field contexts interact (Sinatti et al., 2025, p. 1). These frictions could emerge through negotiations over access, trust, timing, positionality, and expectations, requiring researchers to make context-specific methodological decisions that shape both data generation and interpretation.

The concept of friction captures these dynamics. In physics, friction is the force that opposes motion between two surfaces in contact, shaping how motion unfolds rather than preventing it altogether (Marion, 1981). Analogously, in fieldwork, friction does not halt research; instead, it conditions its direction, pace, and manner (Sieck, 2023, pp. 572-574). As Tsing (2005) noted, friction, "awkward, unequal, unstable, and creative qualities of interconnection across difference", is the characteristic of today's globalisation (p. 4). Such friction alternately brings actors together and pushes them apart, shaping their interactions all the while. It may enable or impede, accelerate or slow the multiple processes underway simultaneously, but it is always generative (Tsing, 2005, p. 6). While Tsing's (2005) concept of friction was developed in the context of globalisation, its effects are inherently situated and locally experienced (Matsumoto, 2025, p. 266). In this paper, fieldwork friction is conceptualised as the tensions, frustrations, misunderstandings, mistrust, and practical constraints that arise when a pre-planned research design encounters the social rhythms, expectations, and priorities of research participants in a real-world context. Rather than treating these frictions as methodological failures, I view them as generative and analytically fruitful moments that shape the production of research data.

Reflexivity is central to understanding how fieldwork frictions shape methodological adaptation and the production of knowledge. England (1994) conceptualises it as the researcher's critical awareness of their positionality and its implications for knowledge production, involving ongoing self-critical introspection and analytical scrutiny of the researcher-as-self (p. 244). Finlay (2002) conceptualises reflexive analysis in research as a continual process of examining subjective responses, intersubjective dynamics, and the research process itself (p. 532). Rather than merely a personal reflection, reflexivity is understood as an analytic practice that situates methodological choices within their social, relational, and institutional contexts (Ochoa, 2026, p. 2).

In this study, reflexivity emerged through ongoing and retrospective critical engagement with fieldwork experiences and methodological decisions during my PhD research, which used an explanatory sequential mixed-methods design. I led the fieldwork, including training and coordinating two field assistants who supported survey data collection. Throughout the research process, discussions with my PhD adviser (Associate Professor Elizabeth Humphrys) prompted me to critically reflect on my methodological assumptions, fieldwork experiences, and interpretations. Fieldnotes and reflexive memos documented instances of uncertainty, negotiation, and methodological adjustment arising during fieldwork. I later revisited these materials alongside the survey and interview data to examine how research design decisions and underlying assumptions evolved in response to fieldwork conditions. This retrospective process informed the methodological reflections presented in this paper.

3. Situating the Field

The study was conducted from July to November 2025 in selected farming communities in Northern Ghana (see Figure 1), a semi-arid region characterised by high temperatures, pronounced seasonal variability, and persistent socioeconomic challenges (Asante & Amuakwa-Mensah, 2014). The region has experienced a higher rate of temperature increase than Southern Ghana due to its proximity to the Sahara and Sahel deserts (Ghana Statistical Service [GSS] 2014), with temperatures increasing by more than 1 °C over the past five decades (Agyeman-Bonsu et al., 2008). Average annual temperatures range from 24 °C to 30 °C, with peak temperatures exceeding 40 °C in March and April (Asante & Amuakwa-Mensah, 2014). The region is characterised by a unimodal rainfall regime, with most precipitation occurring between June and October, followed by a prolonged dry season. These climatic conditions shape farming calendars and intensify heat exposure, particularly among smallholder farmers whose livelihoods depend on outdoor labour.

Beyond climate issues, the region faces long-standing structural and socioeconomic constraints (Songsore, 2003). Colonial policies prioritised resource extraction and industrialisation in Southern Ghana, leaving the North comparatively underdeveloped and politically marginalised (Aryeetey & McKay, 2007; Oteng-Ababio et al., 2017), a situation that persists to this present day. A decade ago, extreme poverty rates in the region ranged from 21% to 45%, higher than the national average of 8.4% (GSS, 2014). Literacy levels remain low at 82%, compared with a national average of 69%, and approximately 80% of the working population is engaged in agriculture (GSS, 2021).

These combined climatic and socioeconomic factors make Northern Ghana vulnerable to climate-induced heat stress, particularly among farming households that rely on strenuous outdoor labour. This vulnerability was a key reason for

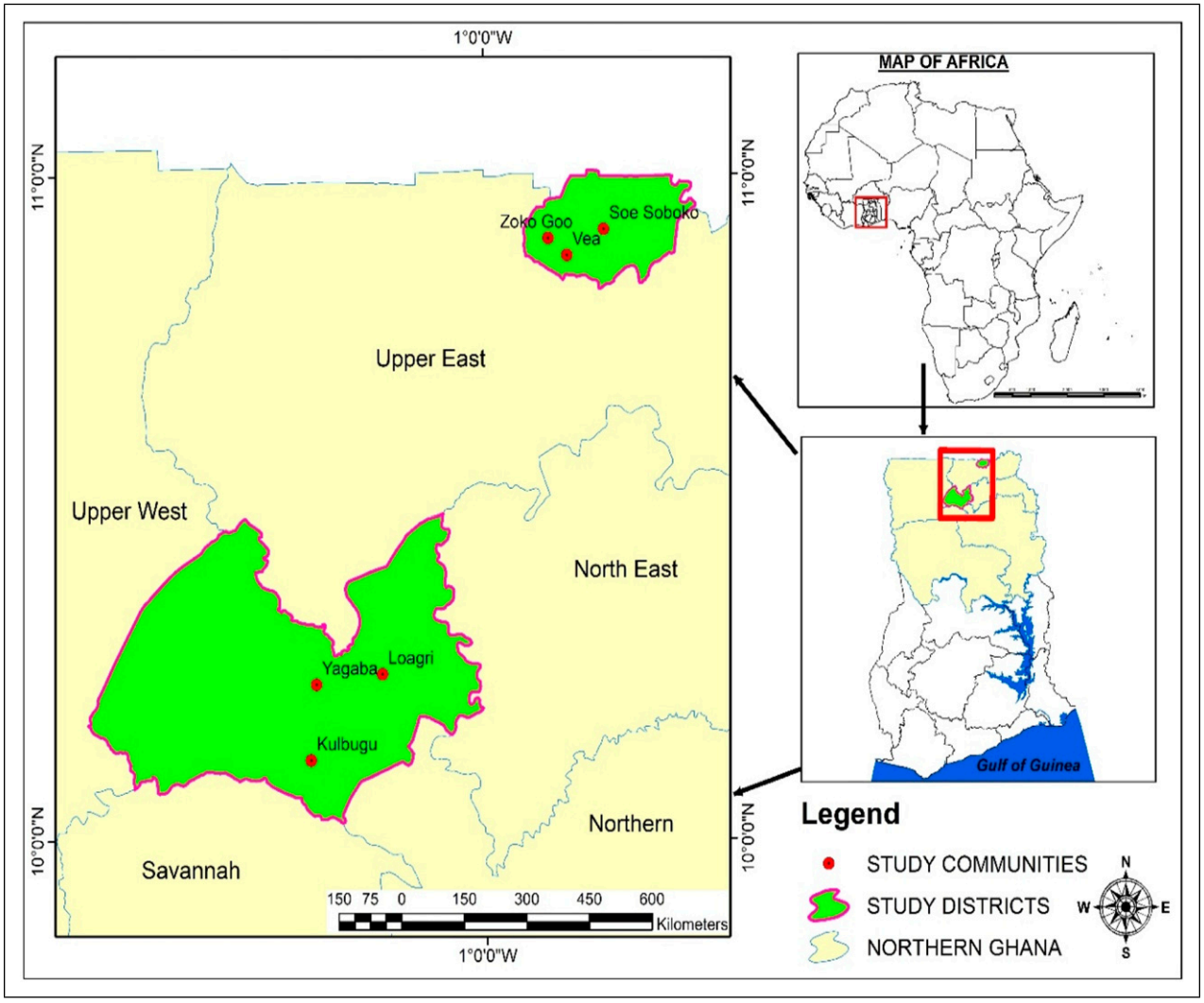


Figure 1. Map of Northern Ghana showing the study communities

selecting the study area. Farming activities such as weeding and harvesting are seasonal, and daily work routines are closely structured around prevailing climatic conditions. These patterns shape not only farmers' exposure to heat but also the temporal possibilities for research engagement. As a result, fieldwork was planned and conducted during this period, situating the research within participants' lived seasonal and climatic realities.

Like many rural communities in the Global South, the farming communities studied are centred on kinship networks and informal norms of reciprocity and trust (Acedo-Carmona & Gomila, 2015; Lyon, 2000). These social connections shape daily economic activities, collective labour practices, social cohesion, perceptions of outsiders, and the negotiation of access to information. My positionality within this context was thus complex. Although I hail from Northern Ghana and share linguistic and cultural ties, my role as a PhD researcher based in Australia placed me in a position between insider and outsider (Maharaj, 2016).

This dual role unexpectedly affected initial beliefs, trust, and engagement, despite having sought the consent of the communities' traditional authorities. As fieldwork unfolded, these dynamics, along with limited opportunities to administer surveys due to farm activities, became central to the study. This field context was not merely a backdrop to the research but an active space in which relationships with participants were built, challenged, and continually negotiated. These conditions influenced how I implemented the research design in practice and set the stage for the fieldwork-related frictions discussed in subsequent sections.

4. Research Design as Anticipation

Before conducting fieldwork, the study was intended to use a mixed methods design grounded in a pragmatist philosophical perspective, recognising that no single approach can adequately capture the complexity of farmers' experiences of climate-induced heat stress and adaptation (Tashakkori & Teddlie, 1998). Mixed methods designs are practical for examining environmental and socio-economic issues by integrating multiple forms of evidence (Frimpong et al., 2020; Tanyanyiwa & Kanyepi, 2015).

Qualitative research designs may produce rich, in-depth narratives of farmers' lived experiences; however, they are usually small-scale and do not aim to make population-level generalisations (Mwita, 2022). Quantitative research designs, in contrast, allow for the assessment of more abstract patterns with larger samples, but often lack the contextual depth needed to capture farmers' perspectives on the structural conditions that underlie vulnerability and adaptation (Savela, 2018).

Pragmatism prioritises practical problem-solving and supports the strategic integration of quantitative and qualitative approaches to address real-world challenges (Morgan, 2014). Guided by this orientation, I structured my data collection around an explanatory sequential design, in which initial quantitative findings were intended to guide subsequent qualitative exploration (Creswell et al., 2003; Shannon-Baker, 2016). Importantly, this design assumed a relatively linear progression from data measurement (household surveys) to explanation, reflecting anticipatory confidence in methodological complementarity before entering the field (Creswell & Creswell, 2017). I intended to collect quantitative data using Kobo Collect through a household survey of randomly selected smallholder farmers, with support from two trained local research assistants. Preliminary analysis of the survey data was intended to identify key themes for subsequent semi-structured interviews with farmers, community leaders, and institutional representatives. The overall aim was to generate deeper explanatory insights into the patterns and trends identified in the initial quantitative phase.

The assumptions underpinning this approach centre on the feasibility of conducting scheduled household surveys and the ease of accessing farming households. I also assumed that my positionality as a Ghanaian (insider), sharing linguistic and cultural backgrounds with participants, would facilitate engagement. Before fieldwork, my PhD supervisor advised me to reconsider these assumptions, including the feasibility of collecting a large sample and the importance of establishing rapport with participants. I initially underestimated these concerns because of my previous field experience and insider positionality; however, fieldwork later showed that familiarity with the research context did not necessarily translate into easier access or effective rapport. As fieldwork progressed, the social, temporal, political, and interpersonal dynamics of the research setting challenged these initial expectations. This necessitates continuous methodological negotiation and adaptation, as discussed in the next section.

In line with this anticipatory design, I developed the survey questionnaire and the semi-structured interview guide concurrently for ethics review and approval; however, the interview guide served as a flexible outline and was to be refined to inform follow-up questions after the survey phase. Instrument development drew on the High Occupational Temperature Health and Productivity Suppression (HOTHAPS) programme and on previous empirical studies examining the impacts of heat stress on workers' health, safety, productivity, and adaptation strategies (Frimpong et al., 2020; Goodman et al., 2023; Newman & Humphrys, 2020; Odonkor & Adams, 2022; Shih et al., 2022). These instruments, together with the study proposal, were submitted to and approved by the University of Technology Sydney Human Research Ethics Committee (approval number: ETH25-10470) prior to travel to Ghana for fieldwork in July 2025.

5. Encountering Frictions in the Field

Following standard ethical and methodological procedures, I began my fieldwork by engaging community gatekeepers — chiefs, elders, and elected assembly members — with the assistance of two local trained research assistants whom I trained and supervised. The standard ethical and methodological procedures I followed helped secure their consent and facilitated access to the farming communities and participants (Miller et al., 2022; Paulsen, 2025). These initial interactions were friendly and cooperative rather than confrontational. After the study's purpose was explained, community leaders expressed appreciation and said they felt privileged to have been selected from among other communities in Northern Ghana to participate. This response reinforced my sense of acceptance as an insider; however, I remained mindful of positioning myself as a learner rather than an authority figure. The interaction sets a constructive tone for the fieldwork process. As (Ganga & Scott, 2006) note, researchers who share cultural or social characteristics with the communities are more likely to be accepted and trusted, although internal social divisions between researchers and participants may still exist (p. 1).

Despite these favourable conditions, several frictions emerged when I began Phase One of the research: the household survey, which constituted the quantitative phase of the explanatory sequential mixed-methods design (Figure 2). I had expected the survey process to proceed smoothly, given the enthusiasm and reassurance of community leaders, my insider positionality, and my prior experience with similar methodologies. However, the realities on the ground soon proved

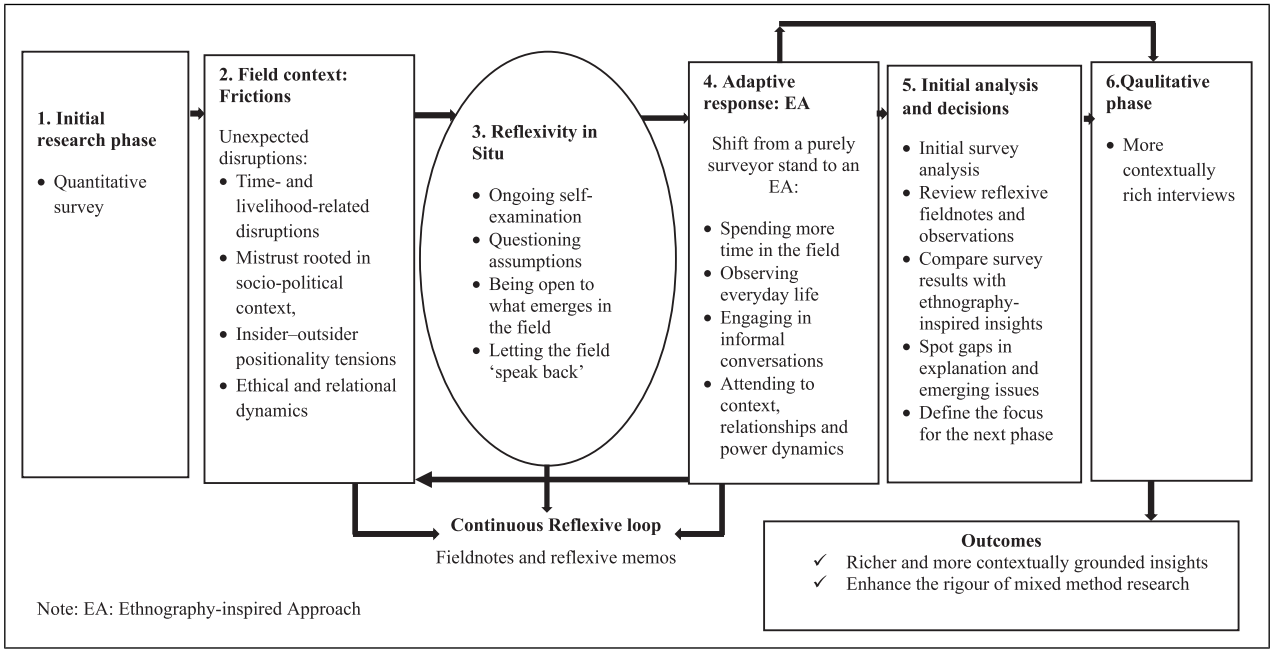


Figure 2. A Contextual Framework for Enhancing Rigour in Explanatory Sequential Mixed Methods Research through Ethnography-Inspired Adaptation in Vulnerable Populations Source: Author's construct (2026). Note: EA: Ethnography-inspired Approach

otherwise, revealing unexpected challenges and underscoring that implementing mixed methods research in practice is not always as straightforward as methodological plans suggest (Creswell et al., 2003). Many farmers were deeply engaged in farming and domestic chores, particularly in the evenings, which limited their availability and made sustained participation challenging. Even when potential participants initially agreed to participate, their involvement was often delayed, rescheduled, or cancelled because of ongoing farming activities and competing livelihood demands.

Besides, trust issues also unexpectedly surfaced. Some farmers perceived me as an outsider because of my institutional affiliation with Australia and my not being originally from their district, despite my broader insider status as a Ghanaian. This experience affirms Narayan's (1993) observation that having cultural or regional roots does not necessarily guarantee easy access to or rapport with research participants (pp. 675-676). The distrust of farmers was often rooted in prior interactions with researchers and non-governmental organisations (NGOs) that had collected information from them without delivering any tangible improvements to their livelihoods (Tran et al., 2025, pp. 89-113). As one farmer put it, "People come, ask their questions, and leave — but our lives stay the same. You are here, wanting to ask us the same questions and improve your life, while we continue to suffer here". Such experiences made participation in the research difficult, despite the many reasons I gave them. Some farmers stated that focusing on their farms was preferable to interviews, which would not yield any benefits.

In other cases, particularly in the Mamprugu Moagduri District in the Northeast Region, some farmers thought I was a politician seeking their votes, reflecting broader apprehensions about political mobilisation and dishonesty (Bertsou, 2019). Some expressed concern that "politicians come during elections and pledge many things, but nothing happens, once it's won," which led to hesitation, even though community leaders knew the purpose of my research. This suggests that researchers in such contexts should recognise how prior relationships with politicians and other researchers shape community members' perceptions of outsiders. Recurrent exposure to unfulfilled promises — especially during election periods — can trigger hesitation among communities, even when the study is intended to fulfil an academic requirement. Thus, researchers should not assume that prior consent from local leaders will automatically establish trust with community members or research participants (Djenontin & Meadow, 2018, p. 896). Instead, to navigate these sensitivities and encourage genuine participation, it may be necessary to articulate the research's goal explicitly, differentiate the research from political actors, and sustain relational engagement to build trust (Harris, 2022, p. 1; Sultana, 2007), an approach I adopted, as discussed in the next section.

Initially, some farmers associated my return from an Australian university with expectations of material support, occasionally remarking on the local expression "Burger have money"— a term typically used to describe Ghanaian migrants believed to have achieved economic success by doing working-class jobs in Western Europe or North America (Boafo & Lyons, 2019; Nieswand, 2014). Rather than reflecting individual opportunism, these expectations could be rooted in historical experiences with development interventions, research encounters, and political engagements that have often

promised material benefits but delivered limited tangible change. When I clarified the study's purpose and explained that participation did not involve financial compensation, some participants reconsidered their involvement, revealing the ethical and relational complexities surrounding informed consent in contexts marked by uneven development. These frictions generated reflexive insights (as detailed in the next section) that reshaped my understanding of my insider positionality, trust, and researcher – participant relationships, thereby affirming Sultana's (2007) argument that fieldwork is "inherently contextual and relational" (p. 374).

6. Reflexivity and Adaptation: From Fieldwork Frictions to an Ethnography-Inspired Approach

Rather than interpreting low participation as evidence of farmers' reluctance to engage with the study, I reflected critically on how my research methods (Goodman & Marshall, 2018, p. 14) and the broader historical and social context shaped participation (Sultana, 2007, p. 375). This reflection also prompted me to reconsider my supervisor's earlier advice about the importance of establishing rapport with participants. I recognised that the survey's timing, location, and formal structure (household survey) did not align with everyday rural life, and that participants' mistrust stemmed from previous experiences with extractive research and unfulfilled political promises (Figure 2). This reflexive practice led me to prioritise surveys with randomly selected household heads on their farms, where participants preferred, allowing relational trust to take precedence over procedural efficiency in data collection (Rallis et al., 2007, p. 404; Sultana, 2007, p. 374).

My first farm-based survey was conducted near the participant's house in Loagri while he was weeding. To minimise disruption to ongoing labour, the survey was conducted alongside routine farm preparation, including weeding and hoeing, with questions asked intermittently as work progressed. This approach enabled the collection of contextually grounded accounts of labouring in the heat and allowed situational observation of farming practices relevant to the survey responses. In line with Tsing's (2005) idea of friction as productive rather than merely obstructive, the challenges encountered in the field created opportunities for deeper engagement with participants and their everyday farming practices (p. 6). Consequently, the combination of relational trust, situated interaction, and situational awareness enhanced the contextual depth of the farm-based survey data relative to formal household surveys, as discussed in Section 7. This farm-based survey approach continued until the target sample size for each study community was reached. However, a substantial portion of the survey was still conducted at participants' homes, in line with their preferences.

These reflexive insights extended beyond farm-based surveys into everyday social engagement. I spent evenings with farmers after they returned from their farms, engaging informally to build rapport, trust, and a sense of belonging, and to signal their initial assumptions about my role and intentions (Tran et al., 2025, p. 103). Crucially, observational insights from these informal interactions and farm-based surveys, together with the preliminary survey findings, helped shape the focus of the follow-up semi-structured interviews, consistent with the explanatory sequential design.

7. The Value of an Ethnography-Inspired Approach

In this study, an ethnography-inspired approach, adopted in response to fieldwork frictions, yielded valuable insights that informed and enriched the qualitative phase (Figure 2). Following the completion of Phase One, I conducted an initial descriptive analysis of the quantitative data collected via KoboCollect, the study's data collection platform. Conducted while still in the field, this analysis provided initial insights into patterns of heat exposure, work intensity, and self-reported health symptoms, as well as adaptive behaviours and the barriers to them in response to extreme heat. I then juxtaposed these quantitative patterns with fieldnotes, reflexive memos, and observations from farm-based surveys and everyday interactions with participants, while remaining attentive to my positionality in the field. This process highlighted that quantitative patterns alone offered limited insight into how these dynamics were embedded in farmers' everyday routines, decision-making, and lived constraints. Fieldnotes and observations were thus used as contextual and reflexive materials to identify issues requiring further exploration during the qualitative phase, as detailed below (Figure 2).

It was particularly through the farm-based surveys that these limitations became apparent. I often observed smallholder farmers' physiological responses to extreme heat — pausing to remove their hats and wipe sweat, stretching sore joints, or slowing their pace while performing farm tasks. Yet when asked in the survey how they managed the heat, some said they were "used to it," expressing a sense of mastery that stood in tension with the visible signs of physical strain embedded in their daily labour. These raised questions about whether suffering has become normalised and highlighted the limits of self-reported adaptation in climate-vulnerable environments. Beyond individual bodily strain, I also noted a couple of instances in which women and children applied fertiliser to rice fields in the intense sun, while men rested under a tree. At other times, men appeared short-tempered towards their spouses during farm work in extreme heat. Furthermore, farmers who reported awareness of heat-related risks and experiencing symptoms in the survey often continued working during peak heat hours, forgoing rest despite visible fatigue.

Informal conversations in the evenings further reinforced insights from the farm-based surveys. Farmers spoke of marginalisation from the development policies and poverty that left them no option but to continue farming, while also describing joint pain, dizziness, and even hospitalisation due to prolonged exposure to extreme heat — experiences that were hard to capture within the predefined survey. I also noted post-farm routines: men relaxing outdoors while women managed household chores, often with their babies strapped to their backs. While this gendered labour was familiar, witnessing it alongside the physical toll of heat highlighted the embodied burdens of everyday life in a particularly striking way.

My reflexive awareness in the field further sharpened these insights. Like the farmers, I was affected by extreme heat during fieldwork, which disturbed my comfort, focus, and work speed. These hands-on experiences enhanced my sensitivity to how climatic conditions influence agricultural labour and research practices. It also highlighted the gap between survey responses —which are often brief or neutral — and the visible signs of fatigue, pain, labour division, hopelessness, unemployment, material deprivation, and reduced work effort, all of which were seldom mentioned in the structured questionnaire.

Taken together, these insights from the survey findings, early field encounters, and reflexive engagement during data collection highlighted the need for probing questions that moved beyond individualised accounts of coping to examine household, social, and structural factors shaping climate adaptation. Accordingly, in the semi-structured interviews, I asked follow-up questions consistent with the ethics-approved interview guide and did not introduce new or sensitive topics. These questions included: "When the heat becomes too intense for farming, who in your household usually decides whether to stop, rest, or continue working? Why?" "Do you sometimes feel you have no choice but to keep working in the heat? Why?" "Are there things you would like to do to manage the heat better, but cannot? Why?" "Despite the heat, what gives you hope or motivation to continue farming in the sun?" These questions were designed to capture the nuanced ways in which heat exposure intersects with family dynamics, labour obligations, and structural constraints — dimensions that the survey alone could not fully capture.

In this way, insights from extended engagement served as an analytic lens, actively shaping the interpretation of quantitative data and informing the refinement of the qualitative phase within the explanatory sequential mixed methods design. Not only did these reflexive insights refine the follow-up qualitative phase, but the extended engagement also facilitated the smooth conduct of the second phase — the semi-structured interviews — by enabling extended fieldwork that fostered trust, rapport, and strong relationships between participants and me. Consequently, the second phase of data collection proceeded with minimal resistance and high levels of participant openness. However, recognising the potential impact of such openness on the data to be produced, I remained critically aware of how prior relationships and familiarity shaped participants' narratives. Throughout the interviews, I systematically probed contradictions and gaps in their accounts to ensure thorough exploration of the subject matter and high-quality data.

Drawing on the field experiences presented above, this paper argues that the explanatory sequential mixed methods design should be understood not as a fixed linear sequence but as an iterative process shaped by fieldwork frictions, reflexive practice, and methodological adaptation. While the design is traditionally presented as straightforward, progressing from (1) quantitative survey to (5) initial analysis, followed by (6) qualitative inquiry to explain quantitative findings (Creswell et al., 2003), the realities of fieldwork require researchers to move back and forth between planned procedures and emergent circumstances (Figure 2).

As Figure 2 shows, rather than unfolding linearly, the research process in this study was far more complex and iterative, including (2) fieldwork frictions that required (3) reflexive engagement and (4) methodological adaptations, guided by an ethnography-inspired approach (which also helped build trust and rapport). These reflexive adaptations enabled the (5) integration of ethnographic sensitivity — including observations, fieldnotes, and reflexive memos — with quantitative survey findings. Fieldnotes and reflexive memos were written throughout the survey phase, reviewed iteratively as data collection progressed, and again after the survey's preliminary analysis. This process focused on recurring observations, emerging issues, gaps, contextual explanations, and patterns that helped interpret or question the quantitative findings. These insights were then compared with the survey findings to identify areas of convergence, divergence, and gaps requiring further exploration. Rather than treating these materials as a separate dataset for formal thematic coding, they were used as interpretive and reflexive resources to contextualise the quantitative findings and inform decisions to refine the qualitative inquiry (6), thereby better capturing field realities. This iterative and flexible approach enhances the richness and contextual depth of the qualitative data while strengthening the rigour of the explanatory sequential mixed methods design by generating more meaningful, contextually grounded explanations of the quantitative findings (Figure 2).

8. Discussion: Methodological Lessons From Fieldwork Frictions

This section presents a methodological argument, grounded in field experience on climate-induced heat stress in Northern Ghana. It argues that fieldwork frictions are not mere disruptions in mixed methods research; rather, they are essential forces

that actively reshape both the research process and the data produced. It emphasises the importance of an ethnography-inspired approach as a vital analytical lens for establishing trust, interpreting context, and strengthening the qualitative phase of an explanatory sequential mixed methods design. In doing so, I nuance the idea that explanatory sequential designs are strictly linear or procedurally stable (Creswell et al., 2003), suggesting instead that they are inherently contingent and adaptive in practice.

A key implication of this reflective analysis is the need for mixed method researchers to critically reassess the methodological assumptions of stability, predictability, and procedural consistency in fieldwork, which are often presented in a linear, orderly manner (Creswell et al., 2003). In practice, however, these assumptions were continually unsettled by field contingencies, including farmers' work schedules, shifting relational dynamics, and my own positionality (Sultana, 2007). These moments of friction exposed the limits of rigid methodological frameworks and demonstrated that fieldwork rarely unfolds as planned (Morgan, 2013, pp. 60-63; Kušić & Záhora, 2020, p. 3; Fàbregues et al., 2021, pp. 10-11). Rather than interpreting such disruptions as methodological failures, this paper argues that fieldwork frictions are intrinsic to the research process and can yield valuable methodological insight when handled reflexively. This argument aligns with Tsing's (2005) assertion that "attention to friction opens the possibility of an ethnographic account of global interconnection" (p. 6). The broader lesson is not that researchers should adopt a particular methodological tradition, but that all elements of the research process remain open to ethically sound revision in the field. Research questions, design logic, and methods may all require adjustment, as exemplified by Obeng-Odoom (2014), who adjusted both his research questions and research design in response to field realities in Sekondi-Takoradi, Ghana. When approached reflexively, these moments can become analytically generative, enabling deeper contextual understanding and methodological refinement (Cvitanovic et al., 2022; Kušić & Záhora, 2020). In my study, frictions served as sites of insight, prompting reinterpretation of survey findings and informing adjustments to the qualitative phase of the explanatory sequential mixed-methods design. Importantly, the productive potential of such friction is not automatic but hinges on the researcher's flexibility and reflexive responsiveness. Without this capacity to adapt methods, expectations, and interactions to field realities, friction risks remain as a disruptive force rather than a valuable methodological resource.

Fieldwork frictions also highlight the critical role of ethnography-inspired, context-sensitive approaches in navigating uncertainty, building trust, and producing contextually grounded data, particularly in socially complex field settings (Cubellis et al., 2021, p. 2029). In these complex conditions, an ethnography-inspired approach proved to be more than an interpretive supplement to survey findings; it served as an analytical lens that actively shaped knowledge of co-production. By employing context-sensitive observation during farm-based survey administration, engaging in informal interactions, and maintaining a sustained presence in the field, I gained valuable insights into labour practices, experiences of heat, adaptive behaviours, and social negotiations that shaped responses to the structured instrument and informed follow-up questions — dimensions that would otherwise have remained obscured. It also facilitated trust and rapport, thereby improving participation and enhancing the depth and quality of qualitative data. Based on these field experiences, I agree with Lowis (2025), who argues that ethnography should be embedded throughout mixed methods research rather than treated as an auxiliary. Doing so will enable researchers to respond to fieldwork frictions in situ, adapt research strategies as contexts shift, strengthen validity, and generate data that are both analytically rich and socially grounded (Lowis, 2025; Morgan-Trimmer & Wood, 2016).

Overall, this paper offers three key methodological lessons for researchers (especially novice researchers) undertaking mixed-methods studies in complex and unpredictable field settings: First, treat fieldwork frictions as part of the research process and as opportunities to gain insights, rather than as mere obstacles. Second, maintain a reflexive attitude that enables continuous adaptation of both the research design and the research questions in response to unfolding field conditions, rather than rigidly adhering to initial frameworks. Third, draw on ethnography-inspired insights to enhance contextual sensitivity and integration across mixed methods, without implying that formal ethnography is necessary.

The experience described in this paper also offers transferable methodological and practical guidance for researchers conducting fieldwork with vulnerable and marginalised groups in comparable contexts. Gaining access requires careful sensitivity to both formal and informal community structures. While local gatekeepers (i.e., chiefs, elders) can facilitate entry, researchers should not equate their approval with that of individual participants, and should create opportunities for participants to give informed, voluntary consent. Additionally, building trust should be seen as an ongoing process rather than a single step before recruitment. Researchers need to invest time in repeated interactions, openly communicate the purpose and boundaries of their research through appropriate local channels, and, where appropriate, participate in or observe participants' everyday activities. These practices can help researchers build trust, better understand participants' experiences, and conduct more meaningful research. Furthermore, where historical mistrust of researchers, politicians, or external organisations exists, researchers should recognise such mistrust as part of the research context rather than interpreting it simply as participant reluctance. Attention to the researcher's positionality is equally crucial, as participants' willingness to engage may be shaped by their perceptions of the researcher. In these contexts, creating space for concerns to be expressed

and responding transparently are essential to building trusting relationships and encouraging participants to share information openly. Finally, when field interactions indicate that the original research design does not fully capture participants' experiences or omits important contextual details of the phenomenon under investigation, researchers need to adapt in the field. Such adaptations, however, should be iterative and evidence-based rather than arbitrary. The main lesson is to remain reflexive and responsive: not to abandon established methods when fieldwork frictions arise, but to recognise when adjustments are needed to maintain research relevance, quality, and ethics.

9. Concluding Remarks on the Contribution to Mixed Methods Research

This paper contributes to mixed-methods research by demonstrating how flexibility, reflexivity, and ethical responsiveness to fieldwork frictions enhance the robustness and credibility of the explanatory sequential mixed-methods design in rural contexts, reframing such frictions as opportunities for methodological refinement rather than drawbacks. While mixed methods research is often presented as a structured, step-by-step process, this study shows that its real-world application is rarely linear and requires researchers to remain attentive and adaptable to unforeseen challenges (Figure 2). Using an ethnographic, context-sensitive approach, the study demonstrates how engaging with fieldwork frictions strengthens the contextualisation of quantitative findings and deepens the relevance and depth of qualitative inquiry, thereby supporting the co-production of knowledge that reflects better field realities. These insights offer valuable methodological lessons for novice mixed methods researchers working in climate-sensitive sectors and rural communities in the Global South, where research environments are often dynamic and unpredictable (Harris, 2022). The developed framework has the potential to guide researchers in designing explanatory sequential mixed methods studies involving vulnerable populations in rural areas of the Global South.

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Ethical Considerations

The Human Research Ethics Committee of the University of Technology, Sydney, Australia, granted ethical approval for this study (approval number: ETH25-10470). Fieldwork procedures complied with the required ethical guidelines, and all participants provided verbally informed consent.

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Data Availability Statement

This study does not rely on formal datasets; it is based on methodological reflections and fieldwork experience.

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