

A Bitter Harvest: Exploring Thresholds of Survival and the Changing Fields of Small-Scale Sugarcane Farming through the Perceptions of Farmers

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Abstract

Climate debt consumes farms. I explored how small-scale sugarcane farmers perceive and navigate environmental and economic volatility. Using a qualitative descriptive design, I thematically analyzed interviews from 10 purposively selected sugarcane farmers to examine disturbances, absorptive capacity, and transformation after threshold. I disclosed that extreme weather and predatory credit force are thresholds of asset liquidation. I recommend a multi-sectoral integration of local governance and the Strengthened SHS Curriculum to build farmer resilience through cooperative support and student-led innovation. Future research may use mediation models for adaptive capacities, mixed-methods for validation of claims, longitudinal vulnerability tracking to trace impacts, and contextual factor analysis for comprehensive understanding agricultural resilience.

Keywords: Bitter harvest, exploring thresholds of survival, changing fields of small-scale sugarcane farming, perceptions of farmers.

1. INTRODUCTION

1.1 The Problem and Its Setting

Small-scale sugarcane farmers across the world experience crop failures within the broader context of climate change, resulting in poverty, debt, and the selling or leasing of agricultural lands (Voora et al., 2023). Their lived experiences reflected increasing livelihood instability as climate-related pressures intensify the economic vulnerability of smallholder sugarcane producers (Nand et al., 2023). These farmers continue to face diminishing financial security and heightened risks of land dispossession as climate-linked disruptions shape global sugarcane production landscapes (Manciya & Ncoyini-Manciya, 2024).

In Brazil, small-scale sugarcane farmers navigate crop failures occurring amid climate change, leading to worsening poverty and land-leasing arrangements with larger agribusinesses (Voora et al., 2023). In South Africa, sugarcane growers reported financial instability and land insecurity as climate-related conditions shape their production experiences and economic outcomes (Manciya & Ncoyini-Manciya, 2024).

In Fiji, Indo-Fijian sugarcane farming communities experienced crop losses under changing climate conditions, resulting in financial pressure, livelihood disruption, and increasing uncertainty among farming households (Nand et al., 2023).

In the Philippines, small-scale sugarcane farmers experience crop failures in the context of climate change, which intensifies poverty and dependence on borrowing, often leading to the sale or lease of farmlands (Zara, 2023). Farmers reported declining earnings and unstable livelihoods as climate-related pressures shape their agricultural outcomes and financial conditions (Beltran & Win, 2023). Many sugarcane growers also faced reduced farmgate prices and weakened economic capacity as climate-linked disruptions affect production and income stability (Halili, 2023).

In Cotabato Province, particularly Kabacan and Matalam, farming communities are highly vulnerable to climate variability, with livelihoods repeatedly affected by flooding, extreme rainfall, and related hazards. Studies showed that these climate shocks significantly reduce agricultural stability and household welfare (Tandog & Condes-Tandog, 2023), while localized flooding in Kabacan disrupts production and weakens economic resilience (Mag-aso et al., 2018). Province-wide evidence also confirmed declining agricultural productivity, unstable yields, and income insecurity due to climate variability (Alla & Bello, 2021). In addition, community narratives from farmer networks and social media groups (KaPlanters Cotabato Sugar Central Co.) reflected crop losses, rising debt, delayed harvests, and financial strain among sugarcane growers. Despite these documented conditions, existing studies remain focused on biophysical impacts and productivity outcomes, with limited attention to the lived experiences, coping strategies, and livelihood transformations of small-scale sugarcane farmers in Kabacan and Matalam. This gap underscores the need for a qualitative descriptive study grounded in resilience theory to examine farmer's lived experiences, adaptive capacities, and threshold-based livelihood changes.

1.2 Significance of the Study

In alignment with Global Sustainability Goals and my academic mission to empower marginalized communities, I positioned this study as a contribution to the advancement of equity and justice within the agricultural sector. I intended for these findings to provide small-scale sugarcane farmers with data-driven insights to fortify their adaptive strategies against environmental and economic volatility. Beyond the farm level, I envisioned this research to serve as a strategic roadmap for Education Administrators and Agricultural Policy Makers to institutionalize integrated programs aligned with the Strengthened Senior High School (SHS) Curriculum. By highlighting the critical role of local chief executives in fostering community-based support, I provided a functional framework for bridging the gap between theoretical models and actual rural practice. Ultimately, I served as a catalyst for future scholars to advance the discourse on rural resilience, ensuring that agricultural sustainability remains a priority in the Philippine developmental agenda.

1.3 Research Question

My study aimed to explore the perceptions of small-scale sugarcane farmers. Specifically, it sought to address the research question:

- What are the disturbing conditions affecting small-scale sugarcane farmers, absorptive and adaptive capacity in confronting the disturbing conditions, and transformation after the threshold/regime shift was reached?

1.4 Assumptions

I assumed that the revelations, narratives, and expressions of my study participants reflected the key components of the Resilience Theory of C. S. Holling (1973), particularly in terms of how they experienced disturbing conditions, demonstrated absorption and adaptation capacity, and underwent transformation in their livelihoods. I expected that their lived accounts would naturally align with these dimensions as they described their responses to climate-related and economic stressors. At the same time, I assumed that some of their narratives could extend beyond these theoretical dimensions, offering additional insights, meanings, or experiences not explicitly captured by the theory, thereby enriching and expanding the understanding of resilience based on their actual lived experiences.

1.5 Theoretical Lens

I anchored the study on the , which conceptualizes resilience as the capacity of a system to absorb disturbances, adapt to changing conditions, and transform when critical thresholds are reached.

I operationalized resilience into three dimensions: disturbing conditions, absorption and adaptation capacity, and transformation of conditions. Disturbing conditions refers to external stressors such as climate variability and economic pressures. Absorption and adaptation capacity describe the farmers' ability to withstand shocks and adjust their farming practices, while transformation of conditions refers to significant shifts such as livelihood diversification or changes in farming systems.

1.6 Conceptual Paradigm

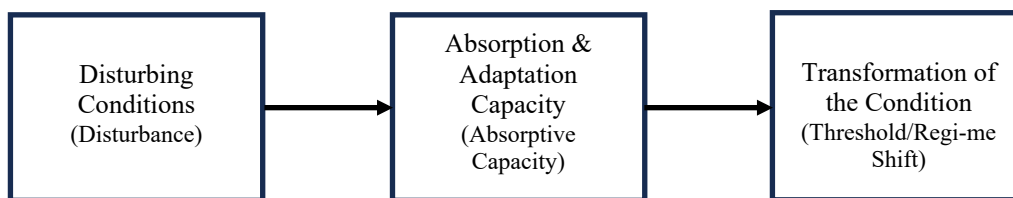


Figure 1. Resilience Theory of C. S. Holling

I found this theoretical lens appropriate as it framed resilience as a context-based and experience-driven process. It also supported the qualitative descriptive approach by allowing a clear and systematic description of farmers' responses to environmental and socio-economic disturbances.

2. METHODOLOGY

In this chapter, I presented the research methodology, including the research design, study location, sample and sampling technique, research instruments, data-gathering technique, data analysis, and measures of trustworthiness.

2.1 Research Design

I employed a qualitative descriptive research design to provide a comprehensive, contextually grounded account of small-scale sugarcane farmers' perceptions. This design was selected for its capacity to

capture real-world phenomena through low inference, ensuring that findings remain closely aligned with participants' original narratives (Lambert & Lambert, 2022). By emphasizing straightforward description, the study generated practical and policy-relevant insights that are accessible to agricultural stakeholders.

Although qualitative descriptive research is generally less theory-driven, I employed Holling's (1973) Resilience Theory as an organizing framework. The theory served as an analytical lens for categorizing findings into disturbances, adaptive capacity, and transformation. This approach supported systematic thematic analysis while preserving the linguistic integrity and contextual meanings of participants' accounts, including those expressed in the local language.

2.2 Locale of the Study

I conducted the study in Sitio Kinudal, Barangay Kilada, Matalam, and Barangay Dagupan, Kabacan, North Cotabato, Philippines. These sites were selected because sugarcane farming served as the main source of their livelihood, yet farmers consistently experienced climate-related challenges. These conditions made the sites appropriate for examining resilience. The locales provided direct access to farmers lived experiences of adapting and sustaining their livelihoods under climate stress.

2.3 Sample and Sampling Technique

I employed purposive, criterion-based sampling to select ten small-scale sugarcane farmers capable of providing information-rich accounts (Omeihe et al., 2024). This method is optimal for exploring perceptions in depth within a qualitative descriptive design (Ayton, 2023). To ensure a comprehensive understanding of the phenomenon, I conducted five In-Depth Interviews (IDI) to elicit personal narratives and a Focus Group Discussion (FGD) with five participants to identify shared community challenges. All participants met the eligibility criteria of at least three years in cultivation and landholdings between 0.5 and 5 hectares. The interview process was concluded upon reaching data saturation. According to Hennink and Kaiser (2022), saturation occurs when repetitive patterns emerge in participants' narratives, confirming the robustness and adequacy of the data.

2.4 Research Instruments

I used a semi-structured interview guide to balance thematic consistency with the flexibility to probe emergent narratives. According to Hennink and Kaiser (2022), semi-structured interviews allow researchers to maintain consistency while exploring participants' emerging experiences in greater depth. This enabled an in-depth exploration of sugarcane farmers' nuanced realities regarding climate volatility and livelihood sustainability.

The instrument focused on three dimensions: disturbances encountered, adaptation capacity, and eventual transformation. Through open-ended questions, I captured how erratic weather patterns disrupted harvests and household survival. Furthermore, I adopted the "researcher-as-instrument" role, using reflexivity to inform conversational dynamics and data interpretation, as emphasized by Yoon and Uliassi (2022). Finally, the guide underwent expert validation to ensure academic rigor, cultural sensitivity, and alignment with the study objectives.

2.5 Data Gathering Technique

I initiated the data gathering process by securing ethical clearances from the Holy Cross of Davao College - Graduate School and the Society for Moral Integrity and Legal Ethics (SMILE) committee, followed by obtaining formal community entry through local leaders in Sitio Kinudal and Barangay Dagupan.

After securing informed consent, I conducted purposively sampled in-depth interviews (IDIs) to elicit personal narratives and a focus group discussion (FGD) to identify shared community challenges. To ensure authenticity, these sessions were held at participant-preferred locations. All interviews were audio-recorded, supported by field notes, and conducted in the local language with subsequent translation to preserve nuanced meanings. I maintained strict confidentiality through the use of pseudonyms. The process concluded upon reaching saturation, where repetitive patterns in the narratives regarding disturbances, adaptation capacity, and transformation confirmed the robustness of the findings (Hennink & Kaiser, 2022).

2.6 Data Analysis

I analyzed the data using a recursive six-phase thematic analysis to ensure a systematic and rigorous interpretation, as proposed by Virginia Braun and Victoria Clarke (2022). Following data immersion and initial coding, I employed a hybrid approach by utilizing C. S. Holling's (1973) Resilience Theory as an organizing framework to categorize the emergent themes into disturbances, adaptation capacity, and transformation, in line with Ayton (2023). This process provided a comprehensive, straightforward summary of the farmers' perceptions while staying closely aligned with their original accounts. To preserve linguistic integrity and capture nuanced meanings, I conducted initial coding in the local language before translating the finalized themes into English.

2.7 Trustworthiness

I established trustworthiness by adhering to the four criteria of rigor: credibility, transferability, dependability, and confirmability by Adler (2022). Credibility was ensured through data triangulation and member checking to verify participant narratives, while transferability was supported by providing thick descriptions of the sugarcane farming context. I maintained dependability through a consistent research process and a transparent audit trail. Confirmability was achieved by practicing reflexivity to ensure that all interpretations were grounded in the participants' actual accounts of disturbances, adaptation capacity, and transformation, as emphasized by Olmos-Vega et al. (2023). Ethical integrity was upheld through the use of pseudonyms and transparent data-handling procedures.

3. RESULTS AND DISCUSSIONS

3.1 Results

In this chapter, I presented the results of my study on the lived experiences of small-scale sugarcane farmers amidst climate change. I also provided the summary of the findings along with the modified paradigm.

3.1.1 Extreme and Unpredictable Weather (Rainfall & Heat)

This theme captures the atmospheric instability experienced by farmers, where erratic oscillations between prolonged waterlogging and thermal extremes serve as primary drivers of crop mortality and the systematic destabilization of sugarcane production.

An initial exploration of the data revealed this participant's response:

Ano gani sir ang amon pinakadako nga problem sa pagtanom sang tubo kay ang sige ka uran-uran...IDI-1-L1-P1 (Sir, our biggest problem in sugarcane farming is the continuous rainfall...) IDI-1-L1-P1

Providing further evidence for this claim, another respondent noted:

Ang akon gid nga gina problema kung mag sige ulan mapatay gid ang akon nga tubo. Mapatay kung mag sige-sige ulan ara sa tagatuhod ang tubig kag mga isa ka semana bag-o ma drain ang tubig -IDI-5-L8-P1 (My biggest problem is that if the rain keeps pouring, my sugarcane will really die. It will die if the rain continues because the water reaches up to knee-level, and it takes about a week before it drains) -IDI-5-L8-P1

This sentiment was echoed by another participant, who mentioned:

Mag sige og init, gamay lang gid ang income namon, kay syempre ang tubo kung sige init, hina ang tubo, kag ang iban mamatay ang tubo kay wala man sang ulan. Kung ang panahon sige init, mugagmay ang tubo - IDI-4-L14-P1 (If it keeps getting hot, our income becomes very small because, of course, when there is continuous heat, the sugarcane grows poorly, and some even die because there's no rain. When the weather is always hot, the sugarcane becomes very small.) - IDI-4-L14-P1

Complementing these views, one participant emphasized:

Kay sadto ang init mga walo gid ka bulan ang among nga na sinati nga init. So sa walo ka bulan, damo gid nga tubo ang napatay kag damo gid nga mga farmers ang apektado. Kay tungod, wala man nagtubo ang o nabuhi ang tubo. - IDI-3-L237-P5 (Before, the heat lasted for about eight months that's what we experienced. So, during those eight months, many sugarcane crops died and many farmers were affected because the sugarcane did not grow or survive.) - IDI-3-L237-P5

As I listened to the participants, I discerned a theme of climatic betrayal where the once-reliable rhythms of nature had transformed into a dual-edged sword of torrential inundation and desiccating heat. I heard how their voices carried the heavy silhouette of sorrow as they described a landscape where the heavens either wept in excess or stood in a scorched and stony silence. Through their narratives, I perceived the farmers as captives to a profound climatic volatility that acted as a silent thief, with floods drowning the promise of the soil and extreme heat draining the very lifeblood from their sugarcane stalks. This experience revealed to me a state of deep agricultural precarity, where these unpredictable elements leave behind enduring scars that go far beyond the fields and fracture the financial and emotional well-being of the farming families.

3.1.2 Crop Failure and Low Productivity

Regarding the participants' accounts of stunted growth and reddening stalks, the theme of Crop Failure and Low Productivity characterizes a state of agricultural stagnation where the convergence of moisture stress and thermal intensity serves as the primary driver of systematic harvest loss.

One participant offered a comprehensive overview of the struggle, stating:

Oo, sir. halos pare-pareha gihapon kami problema hilabi nakung magsige ulan, maglisod gid kami sa pamaagi sang pag-harvest sang tubo kay tungod doble ang gasto. Kung panahon man sa tag-init, sir; failure gihapon ang amon nga tubo- FGD-5-L18-P1 (Yes, sir. We almost have the same problems, especially when it keeps raining. We really struggle with the process of harvesting the sugarcane because the expenses double. Even during the dry season, sir, our sugarcane still ends up as a failure.) - FGD-5-L18-P1

In a similar vein, another participant recounted:

Kung mag sige ka-init, problema gihapon namon. Dako gihapon amon problema kay tungod ma-failure man ang amon nga tubo, hindinaman magdako, hindi naman magtaas. So magpula naor mamatay ang tubo. - FGD-4-L75-P2 (When it keeps getting hot, we also have a problem. It's still a big problem for us because our sugarcane ends up failing—it won't grow bigger; it won't grow taller. So, it turns reddish or the sugarcane dies.) - FGD-4-L75-P2

During the interviews, I heard a recurring cadence of despair in their voices, a profound worry that every drop of rain or ray of sun was no longer a blessing but a threat that doubled their expenses. I saw in their eyes and the weary gestures of their hands the weight of a climatic betrayal, where their crops seemed to surrender to a land turned a sickly red and parched by the unrelenting heat. My interpretation of their responses suggests that this is not merely an issue of farming, but a dark cycle of failure where nature itself has become an adversary suffocating their livelihood. As they spoke, I felt a poignant exhaustion and the sharp sting of their situation, as if I were standing in the middle of their barren fields, feeling the heaviness of their burden while watching their hopes slowly wither alongside the sugarcane.

3.1.3 Financial Instability and Debt Cycle

Analyzing the participants' persistent reliance on credit to mitigate the impact of failed harvests, I discerned a theme of institutionalized fiscal distress, where the cyclical necessity of borrowing for operational survival traps small-scale farmers in an enduring loop of liability and economic vulnerability.

One of the participants stated:

Pag ma-failure ang harvest, sir, may ara gid dako nga epekto sir, eh. May epekto gid siya eh. Kay hindi naman kami kabayad sa amon nga mga utang, so magproblema gid kami kung diin kami magkuha pangbayad sa amon nga financing, kay ang among nga financing gi-utang - IDI-2-L56-P2 (When the harvest fails, sir, it really has a huge impact. It truly affects us because we can't pay our debts, so we end up worrying about where to get money to pay our financing, since our financing is borrowed money.) - IDI-2-L56-P2

Corroborating this view, a separate account of one participant stated:

Ang among nga pinansing halin sa utang, kay tungod wala man kami ikagasto para sa among nga tubuhan. Tapos kulang man ang among nga income, kay na-failure ang harvest, mangutang naman kami. - FGD-4-L18-P1 (Our funds come from loans because we have no money to use for our sugarcane farm. Then our income is still lacking because the harvest failed, so we end up borrowing again.) - FGD-4-L18-P1

Furthermore, one participant disclosed this experience:

Hangtod karon sir, sige gihaon ka antos, sige gihaon pangutang. Ang iban monthly ang pag bayad, ang iban sa harvest na ang bayad. - FGD-2-L48-P1 (Until now, sir, the suffering continues, and we keep borrowing. Some pay monthly, while others pay after the harvest.) – FGD-2-L48-P1

During the interviews, I heard the trembling weight of a systemic trap in their voices, a recurring narrative where the failure of a harvest was not just a seasonal loss, but a financial catastrophe. I witnessed the visible tension in their expressions and the weary stillness of their hands as they described a life tethered to high-interest financing, where "borrowed money" acted as both a lifeline and a noose. My interpretation of these responses is that these farmers are caught in a "vicious cycle of insolvency," where debt is used to fund farming, and farming failures necessitate further debt, stripping them of any real agency or profit. As they spoke, I felt a heavy, suffocating sense of empathy; it was a visceral realization that for them, the soil is no longer just a source of life, but a stage for perpetual struggle against an invisible, growing mountain of interest.

3.1.4 High Production Costs vs. Low Income

Upon reviewing the participants' testimonies regarding the relentless surge in input prices alongside stagnant market returns, I identified a theme of critical economic imbalance characterized by a widening gap between soaring production expenditures and insufficient agricultural income.

One participant articulated a sense of despair regarding fluctuating market prices, stating:

Ay mahal-mahal gid ang abono karon sir. Kada tuig sir, nagamahal nga nagamahal gid ang presyo sang mga fertilizers kag mga medisina. Wala gid na nagabarato sir, halos kada tuig nagamahal gid. Amo na ang dako ang amon nga expenses kag gamay lang amon nga income, kay ngaa ang presyo sang kalamay grabe ka barato. -FGD-4-L261-P5 (Ah, the fertilizers are very expensive now, sir. Every year, the prices of fertilizers and medicines keep increasing. They never get cheaper, sir; almost every year, the prices go up. That's why our expenses are high and our income is small, because the price of sugarcane is extremely low.) – FGD-4-L261-P5

Complementing these views, one participant emphasized:

Kaluluoy lang gid kami nga mangunguma sang tubo, kag dako gid ang pag-antos namon bilang isa ka mag-uuma, kay tungod sa kamahalon sa medisina, kamahalon sa mga abuno, pati na ang expenses sa mga tawo, barato pagid ang presyo sang kalamay te, wala na gid kami sang choice. kundi mag-antos na lang gid kami sini. -IDI-1-L1024-P19 (We, the sugarcane farmers, are truly pitiful, and we suffer greatly as farmers because of the high cost of medicine, the expensive fertilizers, and even labor expenses. The price of sugarcane is still very low, so we have no choice but to just endure this.) – IDI-1-L1024-P19

During the interviews, I heard a sharp, persistent note of indignation and helplessness in their voices as they described the "skyrocketing" prices of essential fertilizers and farm inputs. I witnessed the weary tilt of their heads and the way they gestured toward the horizon with empty palms, symbolizing a life where the cost of production consistently outpaces the rewards of their labor. My interpretation of their narratives is that

these farmers are trapped in a "scissors effect" of modern agriculture, where rising input costs and plummeting market prices act as two blades cutting away their economic agency, leaving them with no choice but "total endurance." As they spoke, I felt a heavy sense of injustice, a visceral reaction to the realization that their back-breaking work in the fields often results in a net loss, turning their primary source of pride into a source of perpetual suffering.

3.1.5 Increased Harvesting and Transportation Costs

This theme illustrates the intensification of operational expenditures, where the combination of rising agricultural input prices and the logistical complications of weather-induced road impassability compels farmers to absorb doubled labor and hauling costs, severely compressing their profit margins within an unfavorable market.

One account from a participants stated:

Isa pud na siya sa rason nga magbaba ang amo nga income kay tungod gamay lang ang amon maharvest. Kung mag sige man ka ulan-ulan, maglisod pud kami sa harvest, dako ang magasto namon sa pagpa-harvest labi na kung nagaulan-ulan, kay kis-a ang dalan, indi makasulod ang truck or maglubong ang truck, so amo na nga medyo madaku gid ang gasto kay mag hataag man kami additional bayad para sa pahakot sang tubo nga gi-harvest. - IDI-4-L24-P1 (This is also one of the reasons why our income decreases because we can only harvest a small amount. If it keeps raining, we also struggle with the harvest, and our expenses for harvesting become high, especially when it's raining, because sometimes the roads are impassable—the truck can't get through or gets stuck. That's why the costs increase since we also have to pay extra for transporting the harvested sugarcane.) – IDI-4-L24-P1

This perspective was further reinforced by another participant, saying:

Amon bayad kay ipahakot pa namon ang among nga tubo halin sa area palakat sa kalsada. So ipakaro nalang namon, sir. So magasto o magbayad na naman kami sang tawo, or magbayad kami sang tawo para nga magpa-tali, tapos magpahakot, mahulog, sir, nga doble ang among nga gasto kay tungod hindi maagian ang dalan, kay tungod sa sige og ulan-ulan. -FGD-1-L24-P1 (Expenses, because our truck that we use to haul our sugarcane can't enter our area, sir, which means our payment doubles since we have to transport the sugarcane from the area to the road. So, we just rent it out, sir. We end up spending or paying for workers again, or paying workers to tie and transport it. It turns out, sir, that our expenses double because the road is impassable due to continuous rain.) – FGD-1-L24-P1

During the interviews, I heard the logistical frustration in their voices, a weary rhythm as they detailed the "hidden tolls" of a landscape turned hostile by the rain. I witnessed the way their hands mimicked the struggle of heavy machinery, gesturing toward the mud where trucks get stuck and roads disappear, portraying a reality where nature physically blocks the path to their profit. My interpretation of their narratives is that these farmers are victims of a "compounded logistical crisis" where environmental factors do not just damage the crop, but dismantle the entire infrastructure of the harvest, turning a difficult job into a financial impossibility. As they spoke, I felt the thick, muddy tension of their predicament; it was a visceral sense of being trapped between a failing field and an impassable road, realizing that their hard-earned harvest was being swallowed by the very earth it grew from.

3.1.6 Cost Minimization through Self-Labor

Based on my analysis of the participants' personal involvement in physically demanding farm tasks to offset rising debt, I identified a theme of autonomous labor as a vital survival strategy, where the substitution of external hired labor with personal manual effort serves as an essential mechanism for fiscal mitigation.

Dominant narratives at the outset reflected this message from one participant:

Ang isa sa pamaagi namon sir para mabawasan among nga gasto kag mabawasan pud ang among utang nga nag-interest, bali ang among nga pamaagi kami na lang ang nagatrabaho, kami na lang naga lampisa, kami na lang nagabrasing-IDI-2-L205-P4 (One of our ways, sir, to reduce our expenses and also lessen our interest-bearing debt is that we do the work ourselves; we do the planting, we do the brushing ourselves.) – IDI-2-L205-P4

This observation aligned with the testimony of another respondent, who maintained:

Kay alangan kung isarig ko lang sa suhol permanente, waay ako sang isuhol, wala ako sang kwarta. Amo na nga kinahanglan, halimbawa, kung Makaya ko lang man mag-ubra, ubrahon ko na lang. kaysa sa mag-gasto pa ako sang ipasweldo sa mga tao-IDI-5-L110-P3 (Because if I rely only on permanent wages, I won't have any payment; I have no money. That's why, if I can do the work myself, I just do it rather than spending more to pay other people.) – IDI-5-L110-P3

A final layer of the participants' experiences was uncovered as one of them noted:

Ang edad ko 70-years-old na, pero naga-trabaho ako sir, bisan 70 years old na ako para makaminus-minus o makabawas man sa akon nga gasto-hunon sir. Kay syempre kung isarig ko nalang tanan-tanan sa gasto pagpahilamon kag iban pa, dako gid ang gasto ko sir. Ang gina-finance ko mandaan sir, ginautang ko lang tapos may interest, para mabawasan ang gastos ko kag makatipid ako nalang ga trabaho kung Makaya ko sir. -FGD-3-L129-P3 (I am 70 years old, but I still work, sir, even at 70, to reduce or lessen my expenses. Of course, if I rely entirely on others for costs like plowing and other things, my expenses would be very high, sir. What I finance, sir, I borrow with interest so that I can reduce my expenses and save money by working myself if I can, sir.) -FGD-3-L129-P3

I identified a poignant theme of cost minimization through self-labor as I reflected on the shared accounts of the research participants. I witnessed a deep-seated resourcefulness born of necessity, where farmers chose to place the full weight of the physical labor upon their own shoulders to shield their households from further debt. I sensed the quiet endurance in their tired gazes and the deep breaths that punctuated their words, especially when a seventy-year-old participant described her refusal to surrender despite the heavy toll of age and exhaustion. Through their narratives, I perceived their toil not merely as farm work but as a vital survival strategy, where they transformed their own sweat and fatigue into a buffer against the rising tide of commodity prices and interest-bearing loans. It became clear to me that for these farmers, labor was the final currency they could offer to protect their livelihoods from the persistent reach of economic constraint.

3.1.7 Continuous Borrowing as Survival Strategy

Drawing from the participants' descriptions of high-interest credit as an indispensable lifeline for both household and operational continuity, I discerned a theme of systemic debt dependency, wherein the repetitive acquisition of loans serves as a primary, albeit burdensome, coping mechanism to sustain agricultural production and family subsistence.

One participant provided a poignant illustration of, debt, stating, the specific operational costs that drive this indebtedness. The participant revealed:

ang utang sir may ara na nga interest. May ara nga 10% kung sa private. Amo na nga bisan may interest sir, nagapaningkamot gihapon ko bahala mangutang nalang ako kay may ara pa ko nga estudyante nga gina gastuhan kay kung indi ako mangutang, wala ako sang kuhaan, sang akon i-kagastos sa akon tubuhan-FGD-2-L33-P1 (The loans, sir, already have interest. There's a 10% rate if it's from a private lender. That's why, even with interest, I still try my best and just borrow money because I still have a student to support. If I don't borrow, I have no source for the expenses needed for my sugarcane farm.) – FGD-2-L33-P1

Paralleling this experience, a separate account illuminated this experience as shared by one participant:

Fertilizers, sa medisina, ug pagtanom sa mga tawo-IDI-4-L81-P2 (That's why we need to borrow money. The loans we have, sir, have interest, but we still borrow so that we have funds and can finance our sugarcane farm. And those funds, sir, we borrow to pay for planting, the tractor, fertilizers, medicine, and labor for planting.) – IDI-4-L81-P2

I noted a somber theme of continuous borrowing as a survival strategy as I reflected on the shared accounts of the research participants. I observed how the traditional adage of the desperate clinging to debt was not a mere expression but a lived reality, where high-interest loans of up to 10% served as the only fragile bridge connecting their agricultural operations to their children's education. I saw a deep undercurrent of sadness and frustration in their voices, perceiving their existence as a precarious walk across a narrow span built entirely from borrowed strength and uncertain outcomes. Through their narratives, I identified a condition where debt had become an inescapable lifeline, a calculated gamble where the farmers were forced to choose between the crushing weight of interest and the immediate risk of hunger. It became clear to me that for these individuals, borrowing was no longer a choice but a recurring sacrifice made to sustain their responsibilities in the face of limited support.

3.1.8 Livelihood Diversification

Reflecting on the participants' transition into livestock raising, rubber tapping, and off-farm labor to buffer against agricultural crises, I identified a theme of strategic income augmentation where the deliberate adoption of multi-sectoral economic activities serves as a stabilizing framework for household resilience and daily subsistence.

A central theme emerged when one participant characterized the situation, saying:

Labi na kung sa panahon sa failure ang amon tubo mafailure kay tungod sa sigig ulan o sa init, ang amon ginabuhay gid sir kay kuan, kanang mag-alaga sa mga hayop, baka, baboy, o kung ano na pa, para lang may buhaton kami nga makatabang sa among nga pang-adlaw-adlaw, kung panahon sa ting-pigado or crisis, may ara kami nga kuhaan sa amon nga

pang-adlaw-adlaw na gastughon-IDI-4-L1025-P19 (Especially when our sugarcane fails due to continuous rain or heat, what we usually do, sir, is raise animals, cows, pigs, or anything we can, so that we have something to help with our daily needs. During times of hardship or crisis, we have something to rely on for our everyday expenses.) – IDI-4-L1025-P19

The narrative consistency was upheld by another participant, who described:

Ang sa akon sir, bisan babae ako naga-tapping ako, sang rubber tree, naga-tapping ako sa lain nga tawo sir, naga porsyento ako Para may ara kami nga kuhaan sang income kag may ara kami nga pagkaon sa pangadlaw-adlaw, kag may ara man ako nga gastuhon sa amon nga kailaangan-FGD-2-L247-P5 (For me, sir, even though I am a woman, I tap rubber trees. I tap for other people and receive a percentage so that we have a source of income, food for our daily needs, and money for the things we require.) – FGD-2-L247-P5

Expanding on this viewpoint, a participant further clarified, saying:

Ang amon ginabuhat sir, para maka padayon sa amon nga pagpanguma sang tubo para lang makapadayon kami sa amon nga panginabuhì adlaw-adlaw kay mamugon kami sir, o magtrabaho sa laing tawo or sa lain tao para lang makakwarta kami kag may-ara man kami income nga magamit namon sa pangadlaw-adlaw.- FGD-4-L247-P5 (What we do, sir, to continue our sugarcane farming and sustain our daily livelihood is to work as laborers or work for other people so we can earn money and have some income to use for our everyday needs.) – FGD-4-L247-P5

Such a reality was not isolated, as evidenced by another participant who remarked:

Ginhatag nila sa amon... naga-padala sila sang teknisyen para magtudlo sa amon kung ano ang mga dapat buhaton sugod sa pagtanom... gitudluan kami kung unsaon paggamit sa fertilizers... nagabisita sila sa area para i-check kung ano nga abuno ang gwapo gamiton. - IDI-1-L1574-P29 (They provided it to us... they sent a technician to teach us what should be done starting from planting... they taught us how to use the fertilizers... they visited the area to check which fertilizer is best to use.) – IDI-1-L1574-P29

This sentiment was mirrored in the account of another participant, who shared:

Kung sa mga medisina or fertilizers nga gamiton, may ara man nga nagahatag sang trainings, seminars, or orientation nga gina-offer sang COSUCECO, amo na ginatawag nila nga teknisyen naga adto sila diri sa amon para i-edukar kami kung ano ang dapat buhaton sa amon nga tubo, ano nga mga medisina ang gamiton para mapatay ang mga sagbot, kag ano nga fertilizer ang gamiton namon para mas gwapo kag dagko ang amon nga tubo kag tamis.-FGD-2-L455-P9 (When it comes to the medicines or fertilizers to use, there are also trainings, seminars, or orientations offered by COSUCECO. These are conducted by their technicians who come to our area to educate us on what we should do with our sugarcane, what medicines to use to kill the weeds, and which fertilizer we should use to make our sugarcane healthier, bigger, and sweeter.) – FGD-2-L455-P9

I identified a multifaceted theme of livelihood diversification as I reflected on the collective accounts

of the research participants. I heard a gritty practicality in their voices as they described seeking alternative anchors, such as livestock raising and rubber tapping, to keep their households afloat when the unpredictable weather threatened to sink their primary crops. I perceived their determination to cross traditional boundaries of labor and endure physical exhaustion in the fields of others, treating these additional tasks as a fragile bridge that supported daily survival while they awaited the uncertain rewards of the harvest.

Furthermore, I recognized how they leaned on institutional guidance as a steadying hand in the field, utilizing technical training and structured learning pathways to strengthen their knowledge against ongoing challenges. Through their narratives, it became clear to me that these diverse activities functioned as a vital safety net, woven from both manual toil and newly acquired expertise to buffer their families against the harsh tides of financial uncertainty.

3.1.9 Utilization of Technical Knowledge and Support

Observing the participants' active engagement with agricultural technicians and institutional training, I identified a theme of knowledge-driven optimization, where the strategic integration of expert guidance on soil nutrition, crop protection, and climate-resilient seedling varieties serves as a fundamental catalyst for enhancing sugarcane quality and farm productivity.

The foundational accounts from the participants established this experience, as one of them shared:

Ginhatag nila sa amon... naga-padala sila sang teknisyan para magtudlo sa amon kung ano ang mga dapat buhaton sugod sa pagtanom... gitudluan kami kung unsaon paggamit sa fertilizers... nagabisita sila sa area para i-check kung ano nga abuno ang gwapo gamiton. - IDI-1-L1574-P29 (They provided it to us... they sent a technician to teach us what should be done starting from planting... they taught us how to use the fertilizers... they visited the area to check which fertilizer is best to use.) – IDI-1-L1574-P29

Providing further evidence for this claim, another participant noted:

Kung sa mga medisina or fertilizers nga gamiton, may ara man nga nagahatag sang trainings, seminars, or orientation nga gina-offer sang COSUCECO, amo na ginatawag nila nga teknisyan naga adto sila diri sa amon para i-edukar kami kung ano ang dapat buhaton sa amon nga tubo, ano nga mga medisina ang gamiton para mapatay ang mga sagbot, kag ano nga fertilizer ang gamiton namon para mas gwapo kag dagko ang amon nga tubo kag tamis.-FGD-2-L455-P9 (When it comes to the medicines or fertilizers to use, there are also trainings, seminars, or orientations offered by COSUCECO. These are conducted by their technicians who come to our area to educate us on what we should do with our sugarcane, what medicines to use to kill the weeds, and which fertilizer we should use to make our sugarcane healthier, bigger, and sweeter.) – FGD-2-L455-P9

The discussion was broadened by a participant stated this observation:

Kung bahin naman sa semilya sir, may ara man nga koan, teknisyan nga nagatudlo sa amon kung anong maayo nga semilya para sa Sa mga area labi na kung sigig ulan-ulan o init, may ara man nga mga teknisyan nga naga tudlo kung ano ang maayo nga variety ang gamiton-IDI-4-L1645-P31 (When it comes to seedlings, sir, there are also technicians who teach us which seedlings are suitable for areas that experience frequent rain or heat, and

there are technicians who guide us on which variety is best to use.) – IDI-4-L1645-P31

I discerned a vital theme of the utilization of technical knowledge and support as I reflected on the collective narratives shared by the research participants. I observed how the presence of technicians and structured field orientations served as a steady compass, guiding the farmers through the complexities of improved planting practices and the precise application of fertilizers. I perceived this institutional assistance as a guiding hand in the field, helping them navigate the difficult choices involved in selecting resilient sugarcane varieties better suited for the changing weather. Through their accounts, I recognized that these training pathways functioned as a bridge between traditional methods and modern agricultural resilience, empowering the farmers to enhance their crop quality and production despite the persistent challenges they faced.

3.1.10 Attempted but Limited Crop Diversification

Noting the participants' experimental but ultimately constrained transitions toward alternative crops like corn and bananas, I identified a theme of precarious agricultural experimentation, where the heightened vulnerability of substitute crops to climatic volatility and structural environmental limitations reinforces a reluctant but necessary adherence to traditional sugarcane cultivation.

At the core of the participants' experiences was this realization:

Naabot pud kami sa punto Sir, nga nag hunahuna kami mag-change cropping... nagmais kami pero kung tig-init o sige ulan, mapatay gihapon ang mais, mao mas maayo gihapon ang tubo. - IDI-2-L1894-P35 (We even reached the point, sir, where we thought of changing crops... we tried planting corn, but during extreme heat or continuous rain, the corn still dies, so sugarcane is still the better option.) – IDI-2-L1894-P35

A distinct but related concern was voiced by a participant who disclosed:

Naka huna-huna man kami sir, nga mag-change cropping, kag magtanom nalang kami sang saging nga lakatan. Pero, isa pud sa amon nga gina-consider kung magkusog ang hangin kag may bagyo, basi ma tumba ang mga saging, ma failure gihapon kami, kay ang katung area namo dito, wala gid sang cover sir, para makatindog ang saging. Amo pud na sir ang amon gina huna-huna. Hangtud nga nagdesisyon nalang kami nga ipadayon gihapon ang tubo-IDI-4-L1917-P35 (We also thought, sir, about changing crops and planting lakatan bananas instead. But one thing we considered is that if strong winds or a typhoon comes, the bananas might fall, and we would still experience crop failure because our area has no cover or protection to help the bananas stand upright. That's why we kept thinking about it, sir. In the end, we decided to continue planting sugarcane.) – IDI-4-L1917-P35

I identified a compelling theme of attempted but limited crop diversification as I reflected on the shared testimonies of the research participants. I observed how their efforts to break away from the cycle of sugarcane failures led them to experiment with crops like corn and banana, only to find that these alternatives often acted as more fragile vessels in the face of climatic storms. I perceived their frustration when corn withered under the desiccating heat and drowned in torrential rains, serving only to deepen the tide of their financial burdens.

Through their narratives, I sensed a constant and weary negotiation with the elements, where the threat of strong winds made even the promise of a new harvest feel like a gamble. It became clear to me

that despite their desire for change, the participants were repeatedly drawn back to sugarcane as a more resilient anchor, viewing it as a stable yet scarred lifeline in a landscape of unpredictable risks.

3.1.11 Exit from Sugarcane Farming

Reflecting on the participants' accounts of land alienation, lease agreements, and total cessation of operations, I identified a theme of involuntary occupational displacement, where the compounding pressure of insurmountable debt, consecutive harvest losses, and urgent familial crises necessitates a terminal exit from sugarcane cultivation as an extreme survival measure.

One participant offered a comprehensive overview of the struggle, stating:

Kung sa akon sir, wala na gid ako nagpadayon sa tubuhan, nag-untat na gid ako, kay nalumos na gid ako sa utang. Amo na sir nga mga bata ko na lang gid, nagspadayon ka obra sa amon area, pero naga tabang lang gyapon ko sir. Nag untat ako sir kay hindi ko na gid kaya kay dako-dako na gid ang akon utang. Sunod-sunod nga na failure ako-FGD-5-L517-P10 (For me, sir, I no longer continued with the sugarcane farm; I stopped because I was overwhelmed by debt. That's why, sir, only my children continue working in our area, but I still help a little. I stopped, sir, because I really can't handle it anymore—the debt has become too large. I experienced consecutive failures.) – FGD-5-L517-P10

Providing further evidence for this claim, another participant shared:

Nag abot na gid ko sa punto nga mag-untat ako sa pagtanom sang tubo. Kay tungod sa pinansing nga rason sir, kay tungod wala nagid ako sang ika-pinans kay nag sunud-sunod nga sige ako ka-failure. Tapos wala ko kabayad sa utang ko kag naga dako ang tubo- FGD-1-L507-P10 (I have reached the point of wanting to stop planting sugarcane. This is because of financial reasons, sir; I have no money left since I experienced consecutive failures. On top of that, I cannot pay my debts, and the interest keeps increasing.) – FGD-1-L507-P10

A similar thread of concern was woven through the testimony of a participant, stating:

Sa karon, wala na kami nagpadayon sa pagtanom sang tubo, kay tungod gibaligya na namon ang among lupa katong panahong nga nagsakit si tatay. Oo sir, isa gid na siya sa rason nga gibaligya ang lupa kay tungod wala na gid kami sang lihukon para ikagastos sa ospital sang among tatay. Katung one point three (1.3) hectares sir, nabaligya namon to sa kantidad nga five hundred thousand plus (Php 500,000 +)-IDI-2-L399-P8 (At present, we no longer continued planting sugarcane because we sold our land during the time our father fell ill. Yes, sir, that was one of the reasons we sold the land, because we had no other funds to cover our father's hospital expenses. That 1.3-hectare land, sir, we sold for more than five hundred thousand pesos (Php 500,000 +).) – IDI-2-L399-P8

Offering a different facet of the same challenge, one participant added:

Ang rason, sir, nga giparintahan o gipaarendo na ko ang akong area sir, nga 9,000 square meter, kay tungod pigado gid kami sir, kay wala na gid kami sang lain kuhaan sa amon nga i-gasto ko sa pang-adlaw-adlaw. Amo na nga giparintahan ko ang area ko. Isa pud sa rason

sir, nga gipaarendo o giparintahan namon ang amon nga tubuhan, kay amo lang man gihapon wala na kami sang igagasto sa pinansing, -IDI-4-L343-P7 (The reason, sir, that I rented out my area, which is 9,000 square meters, is because we were really in need, sir, and had no other source to cover our daily expenses. That's why I rented out my area. Another reason, sir, that we rented out our sugarcane farm is still the same; we no longer had funds to spend.) – IDI-4-L343-P7

I identified a somber theme of exit from sugarcane farming as I reflected on the heavy testimonies of the research participants. I observed a state of profound emotional and financial exhaustion where the land, once a source of life, had become a field that no longer yielded yet still demanded payment. I perceived their fading hope as they described the painful crossroads of their lives, where some were forced to exchange their ancestral soil as a final act of survival to meet urgent medical needs or to prevent the hollow ache of family hunger. Through their narratives, I sensed that even after leaving the fields, the weight of their farming past followed them like a persistent shadow in the form of unpaid debts and accumulating interest. It became clear to me that these irreversible choices were born of a desperate necessity, revealing a landscape where the lack of systemic support transformed their once-steady livelihoods into a sacrifice for mere endurance.

3.1.12 Persistence Despite Hardship

Drawing from the participants' resolute commitment to sugarcane cultivation amidst financial setbacks and geographical constraints, I identified a theme of enduring agrarian hope and structural path dependency, where the optimistic anticipation of market recovery and the absence of viable land-use alternatives compel farmers to sustain their operations despite chronic economic instability.

The lived reality was first described by a participant who remarked:

Wala gid ko naghuna-huna nga mag-untat sa pagtanom sa tubo. Kay sa akong nga ginahuna-huna sir, bahala gamay lang ang income ko or magdako man ang income ko, okay lang gid sir, basta importante may ara ako nga ginapaabot pagkatapos sang isa ka tuig. -IDI-5-L1157-P22 (I never thought of stopping sugarcane farming. In my view, sir, whether my income is small or large, it's okay, as long as I have something to look forward to after one year.) – IDI-5-L1157-P22

In total agreement with the preceding view, another participant highlighted:

Ako sir, nagdesisyon lang gihapon ako sir nga magpadayon ako sa pagtanum sang akon nga tubo bisan ma failure ako, sige lang gihapon, padayon lang gihapon ako kag wala ako naghuna-huna nga mag-untat kay tungod basi matimangan nga magmahal ang presyo sang kalamay, magwapo ang panahon, kag magtaas ang LSTC, makabawi gid ako sa mga failure ko sa niaging tuig, kag makabayad ako sa mga utang ko kag sa interest ka utang ko. Kag para makaginansya man ako kung gwapo gid ang harvest kung lauy-an.-FGD-3-L328-P7 (For me, sir, I have decided to continue planting my sugarcane even if I experience failures; I just keep going and never think of stopping because there might come a time when the price of sugarcane rises, the weather is good, and the LSTC increases. Then I can recover from my previous year's failures and pay off my debts and the interest on my loans. And I can also earn a profit if the harvest turns out well.) – FGD-3-L328-P7

A final layer of the participants' experiences was uncovered as one participant noted:

Sa akong sir, padayon lang gihapon nga padayon sa pagtanom sang tubo sir, kay tungod ang akon nga lupa indi pwede matamnan sang lain nga produkto sir, kundi tubo lang gid, kay isa sa rason nga ang akon nga lupa ara sa sulod, sir, kinahanglan siya sudlon pagid. Kag ang area ko sir, para lang gid siya sa tubo, amo na siya sir nga wala na gid ko sang lain itanom kundi tubo lang gid ang akon nga matanom. -FGD-1-L327-P7 (For me, sir, I continue to plant sugarcane because my land cannot be planted with other crops; it can only be used for sugarcane. One reason is that my land is located inland, so it needs to be utilized. And my area, sir, is only suitable for sugarcane, so I have no choice but to plant sugarcane.) – FGD-1-L327-P7

I identified a resonant theme of persistence despite hardship as I reflected on the collective voices of the research participants. I observed a stubborn commitment to the soil, where many continued to plant their hopes like seeds in a field of uncertainty, preferring the rhythmic wait for a yearly harvest over the void of having nothing at all. I perceived their determination as a continuous act of faith, a belief that one kind season of fair weather and better prices could finally wash away the bitter taste of accumulated debt and previous failures.

Through their narratives, I sensed that for some, this persistence was less a choice and more a path dictated by the land itself, as their inland fields offered no other refuge or alternative crop. It became clear to me that these farmers were tethered to their sugarcane stalks by both hope and necessity, enduring the heavy physical and financial toll in a tireless search for a more stable future.

3.2 Summary of Findings

3.2.1 Disturbing Conditions Affecting Small-Scale Sugarcane Farmers

In my analysis, I found that small-scale sugarcane farmers are adversely affected by several conditions: extreme and unpredictable weather, crop failure, and low agricultural productivity. Furthermore, they face financial instability, recurring debt cycles, high production costs, low market prices for sugarcane, and rising harvesting and transportation costs.

3.2.2 Absorptive and Adaptive Capacity

Based on the narratives, I learned that farmers demonstrate both absorptive and adaptive capacities. These include minimizing costs through self-labor, relying on continuous borrowing/credit despite high interest rates, and engaging in livelihood diversification, such as livestock raising and off-farm work. Furthermore, farmers utilize technical assistance, participate in institutional training and guidance, and exert effort in crop diversification.

3.2.3 Transformation After Threshold / Regime Shift

I identified that when farmers reach a critical threshold where disturbances exceed their coping capacity, they exit from sugarcane farming primarily due to accumulated debt and repeated crop failures as maximum threshold. They sold their lands and assets to meet financial and daily living needs, or leasing or renting out land as an alternative income or survival strategy. Others continued farming despite hardship driven by hope for recovery or future profitability, forced continuation in farming due to structural constraints, and limited livelihood shifts due to lack of alternative opportunities.

3.3 Modified Paradigm

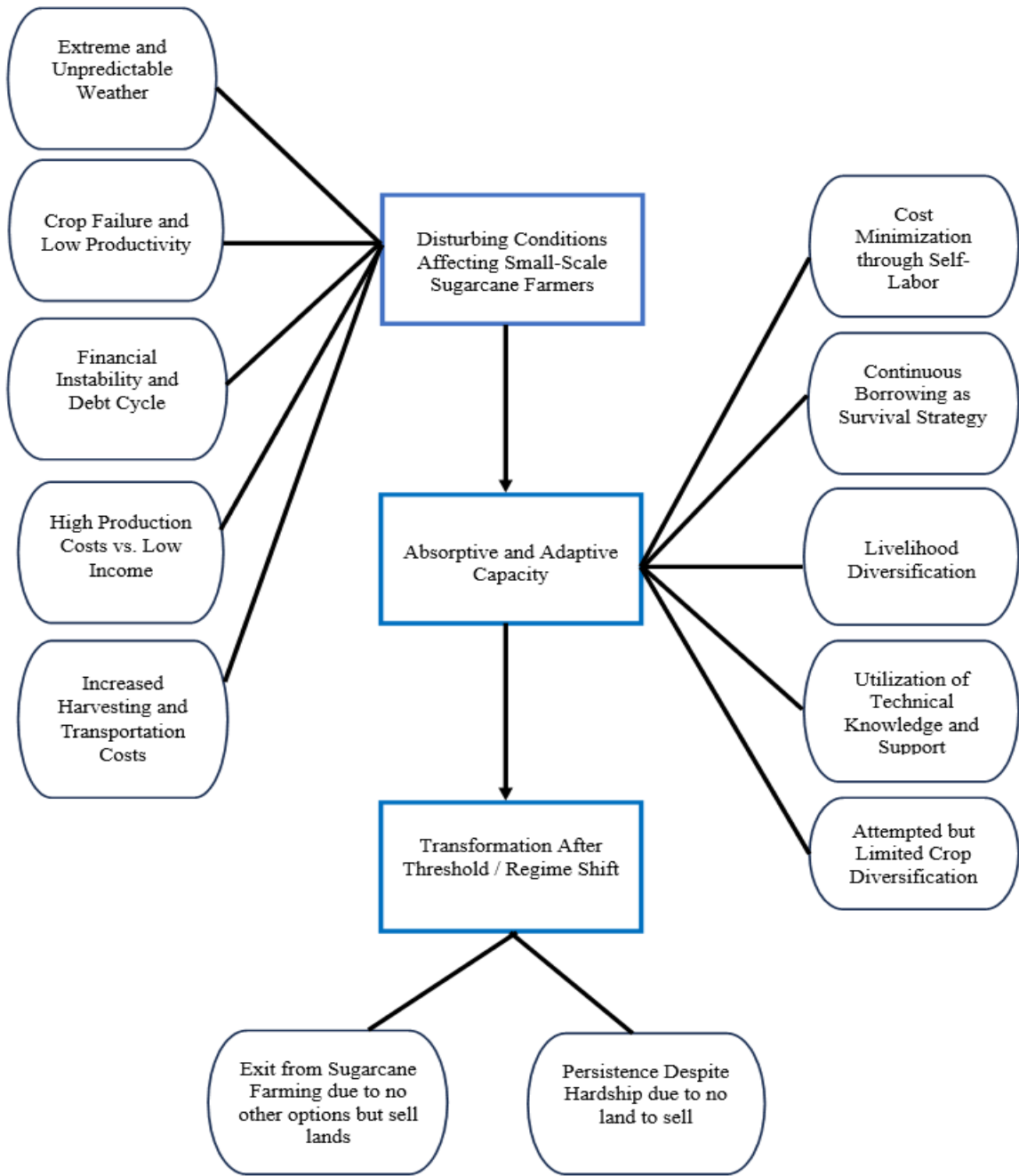


Figure 2. Results of the Thematic Analysis

3.4 Discussions

In this chapter, I discussed my findings. The implications for practice, and future direction of my study are included.

3.4.1 Disturbing Conditions Affecting Small-Scale Sugarcane Farmers

In my analysis, I found that small-scale sugarcane farmers are adversely affected by several conditions: extreme and unpredictable weather, crop failure, and low agricultural productivity. Furthermore, they face financial instability, recurring debt cycles, high production costs, low market prices for sugarcane, and rising harvesting and transportation costs.

I found that my result is consistent with the study of Madamombe et al. (2024), reporting that extreme weather conditions such as irregular rainfall and rising temperatures reduce crop productivity and threaten food and income security. Their finding mirrors my observation that continuous rainfall and intense heat contribute to crop failure and increased economic vulnerability among small-scale sugarcane farmers.

In addition, my finding aligns with the research of Maziya et al. (2024), stating that climate risks, combined with high input costs and weak institutional support, contribute to low agricultural output, financial instability, and food insecurity. Their conclusion strengthens my interpretation that recurring debt cycles, high production costs, and low income are persistent challenges experienced by farmers.

In contrast, I observed a divergence from the study of Katiyatiya and Ncanywa (2025), emphasizing that smallholder farmers can enhance productivity and reduce vulnerability through climate-smart agriculture and sustainable interventions. While their findings suggest that extreme weather and high production costs do not always result in reduced productivity, their perspective differs from my interpretation that these disturbances consistently contribute to agricultural and economic vulnerability among small-scale sugarcane farmers.

3.4.2 Absorptive and Adaptive Capacity

I learned that farmers demonstrate both absorptive and adaptive capacities. These include minimizing costs through self-labor, relying on continuous borrowing/credit despite high interest rates, and engaging in livelihood diversification, such as livestock raising and off-farm work. Furthermore, farmers utilize technical assistance, participate in institutional training and guidance, and exert effort in crop diversification.

I discovered that my findings are congruent with the study of Lamichhane et al. (2022), revealing that smallholder farmers adopt adaptive strategies, such as crop adjustment, farm management improvements, and input optimization, in response to climate stress. However, their research also noted that these strategies are often constrained by economic, informational, and environmental limitations.

In addition, I observed that my finding is consistent with the analysis of Okolie et al. (2024), highlighting that livelihood diversification, crop diversification, and reliance on technical and institutional support are common adaptation strategies under climate variability. Their analysis strengthens my understanding that farmers employ multiple coping mechanisms, even though these remain constrained by persistent structural and resource limitations.

In contrast, I identified a divergence from the investigation of Lambarraa-Lehnhardt et al. (2024),

reporting that in some contexts, smallholder farmers demonstrate limited adaptive behavior due to resource and institutional constraints, resulting in minimal engagement in diversification. Their finding differs from my interpretation, as I found that farmers actively employ a wide range of adaptive strategies despite ongoing limitations.

3.4.3 Transformation After Threshold / Regime Shift

I identified that when farmers reach a critical threshold where disturbances exceed their coping capacity. They exit from sugarcane farming, primarily due to accumulated debt and repeated crop failures as maximum threshold. They sold their lands and assets to meet financial and daily living needs, or leasing or renting out land as an alternative income or survival strategy. Others continued farming despite hardship driven by hope for recovery or future profitability, forced continuation in farming due to structural constraints, and limited livelihood shifts due to lack of alternative opportunities.

I determined that my result is consistent with the investigation of Cook et al. (2025), revealing that smallholder farmers experiencing climate shocks, economic losses, and declining productivity often adopt “stepping-out” strategies such as partial farm exit, land reallocation, and diversification into non-farm livelihoods. Their finding supports my interpretation that livelihood transitions occur when farming systems become economically unsustainable, leading to exit and structural adjustment among vulnerable farmers.

Similarly, I observed that my finding is congruent with the study of Zenda (2024), highlighting that smallholder farmers respond to climate-related and economic pressures by adopting various livelihood and adaptation strategies to sustain their households. Zenda’s perspective strengthens my understanding that livelihood adjustments and diversification emerge as common responses when agricultural productivity and economic stability decline.

In contrast, my observation diverged from the empirical study of Chigadolli (2022), reporting that many smallholder farmers remain engaged in agriculture despite severe stress by relying on adaptation strategies. While Chigadolli (2022) emphasizes persistence, my findings suggest that such pressures more commonly lead to farm exit, land disposition, and livelihood transition when coping capacity is exceeded.

IMPLICATIONS FOR PRACTICE

To address the sustainability of small-scale sugarcane farmers facing climate disruptions and surging production costs, I propose that education administrators and agricultural policy makers institutionalize curriculum models that leverage the new elective system to enhance farmers’ adaptive capacities through community-based innovation. To provide the necessary structural foundation, I implore local chief executives to revitalize farmer cooperatives by providing accessible credit and shared transportation, thereby breaking the cycle of debt-based survival. Within this ecosystem, teachers may serve as the essential facilitators who bridge theory and practice by mentoring students in real-world problem-solving through the Academic and Technical-Professional (TechPro) tracks. Under this framework, students choosing electives in the Science, Technology, Engineering and Mathematics (STEM) and Agri-Fishery clusters can innovate low-cost agricultural technologies and lead sustainable farming initiatives, while those in the Business and Social Science clusters facilitate financial literacy and institutional linkages. Collectively, I believe these synchronized efforts will ignite a transformation, turning parched fields of vulnerability into a resilient landscape of climate-responsive hope.

FUTURE DIRECTIONS

Based on my findings, I propose future studies employing mediation analysis models where absorptive and adaptive capacities serve as mediating variables in the relationship between disturbing conditions and farmers' transformation outcomes. Mixed-method research designs may also be conducted to validate the interaction between disturbances, coping capacities, and regime shifts. Additionally, longitudinal studies may be undertaken to capture how farmers transition across critical thresholds over time and to identify tipping points of vulnerability. Future researchers may also explore contextual factors such as institutional support, infrastructure, and market access that may strengthen or weaken adaptive capacity, thereby providing a more comprehensive understanding of agricultural resilience and sustainability.

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