

ADAPTATION STRATEGIES FOR WOMEN ENGAGED IN DAIRY PRODUCTION IN THE FACE OF EMERGING SECURITY CHALLENGES IN KADUNA STATE, NIGERIA

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ABSTRACT

This study examines the adaptation strategies of dairy women in the face of emerging security challenges in Kaduna State, with particular attention to the effects of insecurity on local dairy production, household nutrition, and rural livelihoods. The study is guided by four research questions and objectives and adopts an interpretivist research approach, which is qualitative in nature. Both primary and secondary data were utilized; primary data were collected through Key Informant Interviews (KII), Focus Group Discussions (FGD), and In-Depth Interviews (IDI), to capture the lived experiences and perceptions of dairy women facing insecurity in Kaduna State. Secondary data were obtained from newspapers, journal articles, policy briefs, and books, thereby enhancing the validity and reliability of the study through triangulation and a more robust understanding of the research problem. Furthermore, the study integrates the Sustainable Livelihood Framework (SLF) and Gender and Development (GAD) theories to provide a comprehensive analytical perspective. While the SLF emphasizes livelihood assets, vulnerabilities, and adaptive capacity, the GAD framework highlights the gendered dimensions of resource access, decision-making, and empowerment. The findings reveal that insecurity, driven by armed conflict and climate change, has systematically disrupted dairy production, destroyed critical assets, and trapped dairy women in cycles of poverty, insecurity, and limited market access. In addition, the study shows that persistent gender inequality, weak institutional support, and reliance on short-term coping strategies continue to undermine women's economic empowerment, even though collective action presents some potential, albeit constrained by structural and cultural barriers. In conclusion, the study recommends the adoption of a gender-responsive and community-driven approach by government and relevant stakeholders to strengthen dairy women's resilience. This should include the provision of secure infrastructure, improved financial inclusion, the promotion of cooperative development, and the implementation of inclusive policies that integrate women into decision-making processes while safeguarding their livelihoods.

Keywords: Dairy Women, Adaptation Strategies, Insecurity, Milk Production, Livelihood.

1.1 INTRODUCTION

Dairy production has long played a central role in food systems and rural livelihoods across the world, particularly in Europe where it evolved into a highly organized and technologically advanced sector. Countries such as the Netherlands and Denmark exemplify how coordinated value chains, supported by strong institutions, veterinary services, and stable rural environments, enhance productivity and ensure consistent milk supply. Within these systems, women have traditionally contributed to milk processing and household nutrition, even when their roles were less formally recognized. Over time, investments in mechanization, quality control, and market integration have strengthened both economic outputs and dietary contributions of dairy products. Consequently, Europe's experience highlights the importance of institutional stability and security in sustaining dairy systems and protecting the livelihoods of those involved (Food and Agriculture Organization [FAO], 2019; Organization for Economic Co-operation and Development [OECD], 2020).

In West Africa, dairy production remains predominantly traditional and pastoral, yet it continues to play a critical role in livelihoods and nutrition. In countries such as Mali, women are central actors in milk handling, processing, and marketing, often organized in cooperatives that produce fermented milk, butter, and cheese. These activities contribute significantly to household income and improve access to essential nutrients, particularly protein and calcium. Over the past two decades, locally produced dairy has supported food security for millions of rural households, with women serving as key agents in sustaining family nutrition. However, the sector faces increasing challenges, including climate variability, poor infrastructure, and more recently, insecurity linked to armed groups and communal conflicts. These pressures have disrupted pastoral mobility and market access, thereby constraining women's dairy activities and weakening their economic contributions (Corniaux et al., 2014; FAO, 2018; International Fund for Agricultural Development [IFAD], 2019).

Across Africa more broadly, countries such as Kenya demonstrate the potential of a more developed smallholder dairy sector. In Kenya, dairy contributes approximately 4–8% of national GDP and supports the livelihoods of over 1.8 million smallholder farmers, with women responsible for a substantial share of milk production, processing, and sales. Over the last 20 years, increased dairy productivity has significantly improved household nutrition by enhancing access to animal protein and providing regular income streams. Women have used dairy proceeds to support children's education, healthcare, and food security. Nevertheless, emerging challenges—including climate change, land pressure, and localized insecurity—are beginning to undermine these gains. These dynamics underscore the vulnerability of dairy systems to external shocks and the critical need to safeguard women's roles within them (Omore et al., 2019; FAO, 2020; World Bank, 2021).

In Nigeria, dairy production remains largely pastoral and informal, with women—especially among Fulani households—playing vital roles in milking, processing, and marketing products such as nono and fura da nono. Historically, dairy has contributed to both household nutrition and rural economies; for instance, over 180,000 households were engaged in milk production in the late 1980s, and women's activities have continued to support family diets

over the past two decades (FAO, 1988; Ayendele, 2020). In response to growing demand and heavy reliance on imports (estimated at over 60% of national consumption), the Central Bank of Nigeria introduced backward integration policies to encourage local milk production and reduce import dependence. Despite these efforts, persistent insecurity—particularly farmer–herder conflicts, banditry, kidnapping, and cattle rustling—has significantly disrupted pastoral systems. Between 2011 and 2021, it is estimated that over 1.5 million cattle were rustled across northern Nigeria, with thousands killed during violent raids, leading to substantial economic losses (SBM Intelligence, 2021; International Crisis Group, 2018; Nigeria Bureau of Statistics [NBS], 2022).

The situation is particularly severe in Kaduna State, where insecurity has intensified over the past decade. Reports indicate that between 2015 and 2023, tens of thousands of cattle were rustled in Kaduna alone, with some local government areas experiencing repeated attacks that wiped out entire herds (Kaduna State Government Reports, 2021; Armed Conflict Location & Event Data Project [ACLED], 2023). For dairy women, these losses translate directly into reduced milk production, diminished income, and declining household nutrition. Over the last 20 years, women’s contributions to family diets—through daily milk provision rich in protein and micronutrients—have been significantly eroded as herd sizes shrink. Moreover, insecurity has restricted access to grazing areas and markets, forcing many women to adopt coping strategies such as reducing milk consumption, diversifying livelihoods, or relying on informal support systems. As a result, dairy women in Kaduna are increasingly vulnerable, with their livelihoods undermined by the combined effects of violence and economic disruption. This evolving context underscores the urgent need to examine adaptation strategies that can sustain women’s participation in dairy production despite growing security challenges (International Crisis Group, 2020; Mercy Corps, 2022; FAO, 2021).

1.2 Statement of the Problem

Dairy production in Nigeria has long remained underdeveloped despite its critical role in supporting rural livelihoods and household nutrition. Over the past two decades, women—particularly within pastoral Fulani communities—have played a central role in milking, processing, and marketing dairy products, thereby contributing to family income and dietary intake. However, Nigeria continues to face a significant gap between domestic milk production and demand, with over 60% of dairy products supplied through imports. This structural deficit persists despite policy efforts such as the backward integration programme introduced by the Central Bank of Nigeria to promote local production. Consequently, the inability of the domestic dairy sector to meet national needs reflects deeper systemic challenges, including low productivity, weak value chains, and limited institutional support for smallholder producers, particularly women (FAO, 2021; CBN, 2019; World Bank, 2021).

More critically, the growing incidence of insecurity across northern Nigeria has intensified these structural challenges and significantly disrupted pastoral livelihoods. Violent conflicts linked to farmer–herder tensions, banditry, kidnapping, and cattle rustling have led to widespread displacement, loss of livestock, and restricted access to grazing and markets. According to International Crisis Group (2018; 2020), these conflicts have escalated in both frequency and intensity, undermining rural economies and eroding livelihood systems. Similarly, reports by SBM Intelligence (2021) estimate that over one million cattle have been rustled in northern Nigeria in the last decade alone, representing a substantial loss of

productive assets. For dairy-dependent households, these losses directly translate into reduced milk production, diminished income, and declining household nutrition. Despite these realities, existing interventions have largely focused on security responses, with limited attention to how affected populations especially women—adapt their livelihoods under such conditions.

The situation is particularly acute in Kaduna State, where recurring violence has disproportionately affected pastoral communities and exacerbated the vulnerability of dairy women. As primary actors in milk production and processing, women are directly impacted by shrinking herd sizes, mobility restrictions, and market disruptions caused by insecurity. Evidence suggests that these challenges have significantly reduced women's capacity to sustain dairy-based livelihoods, thereby increasing household poverty and food insecurity (Mercy Corps, 2022; FAO, 2021). Furthermore, while studies have examined farmer–herder conflicts and rural insecurity in Nigeria, there remains a limited understanding of the specific adaptation strategies employed by dairy women to cope with these disruptions. This gap highlights the need for focused research that not only examines the gendered impacts of insecurity on dairy production but also identifies locally grounded strategies that can enhance resilience and sustain livelihoods in conflict-affected settings.

1.3 Research Questions

1. What are the major forms of insecurity affecting dairy production among women in Kaduna State?
2. How have these security challenges impacted milk production, household nutrition, and income among dairy women?
3. What adaptation strategies are dairy women adopting to cope with the effects of insecurity on their livelihoods?
4. What institutional or policy support mechanisms can enhance the resilience of dairy women in conflict-affected areas?

1.4 Research Objectives

1. To identify the major security challenges affecting dairy production among women in Kaduna State.
2. To assess the impact of insecurity on milk production, income generation, and household nutrition.
3. To examine the coping and adaptation strategies adopted by dairy women in response to these challenges.
4. To evaluate existing institutional and policy interventions aimed at supporting dairy production and women's livelihoods.

1.5 Research Assumptions

1. Insecurity particularly cattle rustling, banditry, and farmer–herder conflict—has significantly reduced dairy production among women in Kaduna State.
2. Dairy women experience disproportionate livelihood losses due to their dependence on livestock for milk production and income.
3. Dairy women have developed local adaptation strategies to cope with insecurity.
4. Strengthening institutional support and security interventions will improve resilience and sustainability of dairy-based livelihoods.

1.6 Methodology of the Study

This study is guided by an Interpretivism research philosophy. The interpretivism is appropriate because the study seeks to understand the lived experiences and perceptions of dairy women facing insecurity in Kaduna state. It emphasizes the **subjective realities** of women as they navigate challenges like cattle rustling, banditry, and farmer–herder conflicts, and the strategies they adopt to sustain milk production and livelihoods.

In line with this philosophical orientation, the study adopts a qualitative research design and utilizes both primary and secondary sources of data to ensure a comprehensive analysis. Primary data are collected through Key Informant Interviews (KIIs), Focus Group Discussions (FGDs), and In-Depth Interviews (IDIs) conducted with dairy women and relevant male stakeholders within Kaduna State. These methods facilitate rich, detailed insights into participants' experiences, coping mechanisms, and adaptation strategies. Furthermore, purposive sampling is employed to select participants who possess relevant knowledge and experience related to the subject matter.

Secondary data was obtained from a wide range of credible sources, including existing literature such as reports from international organizations (e.g., FAO), policy briefs, academic books, peer-reviewed journal articles, newspapers, e-books, e-journals, and relevant government publications. The integration of these data sources enhances the validity and reliability of the study by allowing for triangulation and a more robust understanding of the research problem.

1.7 Theoretical Framework

The study adopted sustainable livelihoods framework and Gender and development theories, which are relevance to the study.

The **Sustainable Livelihoods Framework** propounded by Chambers & Conway, 1992 offers a holistic approach to understanding how individuals and households sustain their livelihoods amid shocks and stressors. It emphasizes five forms of capital human, social, natural, physical, and financial—as well as the vulnerabilities and external factors that influence livelihood outcomes. In the context of Kaduna State, SLF is particularly relevant for analyzing how insecurity manifested through cattle rustling, banditry, and farmer–herder conflicts—affects dairy women's access to productive assets, reduces milk production, and threatens household income and nutrition. The framework also facilitates the examination of adaptive strategies employed by women to maintain their livelihoods, including herd management adjustments, market innovations, and social network mobilization. By applying SLF, the study can systematically assess the resilience and sustainability of dairy-based livelihoods under persistent security challenges

The **Gender and Development (GAD) theory** emerged in the late 1980s as a critique and evolution of earlier frameworks such as Women in Development (WID), which often treated women as a separate category of concern rather than addressing the structural inequalities that shape gender roles. The GAD approach was pioneered by feminist scholars and practitioners including Caroline Moser, Naila Kabeer, and others working within development institutions and academia. Theory focuses on the social, economic, and political relations between men and women, highlighting issues of equity, empowerment, and

participation (Moser, 1993). Within Kaduna's dairy sector, GAD is relevant because women are the primary actors in milk production and processing, yet they face disproportionate vulnerabilities due to limited access to resources, decision-making, and security protections. The theory provides a lens to explore how gendered roles and social norms shape women's ability to respond to insecurity, manage livestock, and sustain household nutrition. It also underscores the importance of policies, cooperatives, and institutional interventions that can empower dairy women, enhance their coping strategies, and strengthen resilience against both economic and security shocks.

1.8 Thematic Literature Review

This section explores the existing literature on the intersection of security challenges, rural livelihoods, and gender dynamics within the dairy sector. The review synthesizes findings from various scholarly works to understand how conflict impacts pastoral communities and the specific ways dairy women adapt to these disruptions. By examining both local realities in Kaduna State and comparative international cases, this review highlights the persistent gaps in policy and the immediate need for sustainable adaptation frameworks. The analysis relies on recent empirical studies combined with foundational theoretical texts to present a comprehensive view of the challenges dairy women face.

1.8.1 Security Challenges and Dairy Farming

The Nigerian agricultural sector has historically faced numerous structural and environmental challenges. Falola (1999) traces many of these systemic fragilities back to colonial resource management policies that marginalized nomadic pastoralists. In recent years, these foundational issues have evolved into severe security crises. The International Fund for Agricultural Development (IFAD, 2018) notes that fragile contexts in rural Africa are increasingly defined by a total breakdown of local governance and security infrastructure. In Kaduna State specifically, the security landscape is dominated by escalating farmer-herder conflicts, armed banditry, and kidnapping. Samuel (2023) highlights that these conflicts are not isolated incidents but represent a systemic collapse of rural safety, severely restricting the movement of pastoralist communities.

Women experience these conflicts very differently than men. Enloe (2000) argues that militarized conflicts are inherently gendered, often targeting the symbolic and reproductive roles of women. This perspective is supported by Rosenblad et al. (2007), who detail how rural women transform from passive victims into primary household providers when conflict disrupts traditional male dominated economic activities. Ogundipe (2018) further asserts that women in Nigeria face unique vulnerabilities to violence, which restricts their mobility and their ability to engage in commerce.

Climate change acts as a massive threat multiplier in this context. Badejo (2017) conducted a comprehensive study in the Kachia Grazing Reserve of Kaduna State and found that environmental degradation directly undermines pastoral security. Poor soil quality, water scarcity, and heat stress reduce livestock feed intake, which subsequently lowers milk production. Onuh (2023) provides direct evidence that climate variability, particularly drought and erratic rainfall, forces herders to migrate southward. This migration triggers violent clashes with sedentary farmers over scarce land and water. These environmental and

security pressures create a hostile environment that makes traditional dairy farming almost impossible for rural women.

1.8.2 Effects on Milk Production and Sales

The immediate consequence of rural insecurity is the severe disruption of the dairy value chain. When grazing routes are blocked by conflict or the fear of kidnapping, women are unable to access the resources needed to feed their cattle. Muloi et al. (2018) demonstrate that informal milk markets, which are heavily dominated by women, suffer greatly when movement is restricted. In their study of camel milk value chains, they found that informal channels lack protective regulations, making women highly vulnerable to external shocks. Samuel (2023) notes that in Kaduna, the inability to reach safe markets forces women to rely on exploitative middlemen or to sell their products at significant losses within their immediate, impoverished settlements.

Processing milk into value added products like butter and ghee is a primary way for women to increase their income. However, Nagasha et al. (2024) observe that women in smallholder systems face massive barriers to value addition. The traditional methods they use are physically demanding and time consuming. When conflict forces displacement, women lose access to the basic tools and hygienic spaces required for safe processing. Jagadeesha (2024) points out that a lack of modern technology and proper training keeps women trapped in low yield production cycles.

Furthermore, there are severe health and sanitary risks associated with disrupted dairy production. Badejo (2017) emphasizes that poor infrastructure, such as a lack of clean water and weak veterinary services, leads to the rapid spread of zoonotic diseases. When conflict prevents women from accessing clean water, the hygienic quality of the milk drops drastically. Muloi et al. (2018) warn that the lack of cold chain storage in informal markets creates massive food safety risks.

To clearly illustrate the measurable impact of these environmental and security disruptions on the dairy sector, the following table synthesizes quantitative data from recent empirical studies.

Table 1: Empirical Impact of Climate and Conflict on Dairy Yields and Business Viability

Variable or Threat	Empirical Observation	Source
Drought Conditions	A statistically significant negative effect showing that increased drought leads to an 18.3% decline in the milk business output.	Onuh (2023)

Variable or Threat	Empirical Observation	Source
Rainfall Increases	A percentage increase in rainfall is correlated with a 65.1% boost in milk business performance due to improved pasture.	Onuh (2023)
Conflict Casualties	1,188 lives lost in 160 specific attacks between 2005 and mid-2021 in Kaduna State, causing massive displacement of dairy farmers.	Samuel (2023)
Market Informality	94% of milk supplied to major urban centers via informal chains is unregulated, exposing women traders to high economic risks.	Muloi et al. (2018)
Resource Scarcity	98% of surveyed pastoralist communities report that grazing occurs under conditions of severe uncertainty and insecurity.	Mani et al. (2024)

The data in Table 1 reveals that the dairy business is highly sensitive to both environmental shocks and violent conflict. The 18.3% decline in business output due to drought (Onuh, 2023) represents a massive loss of capital for women who already operate on slim margins. Furthermore, the sheer scale of the violence documented by Samuel (2023) explains why 98% of grazing occurs under uncertain conditions (Mani et al., 2024). These disruptions affect women disproportionately because women are primarily responsible for the daily processing and selling of milk, yet they lack the mobility to safely navigate conflict zones or the capital to invest in climate resilient infrastructure.

1.8.3 Income Loss and Family Challenges

When insecurity leads to cattle rustling, the economic devastation for pastoral families is immediate and severe. Das and Singh (2020) argue that the loss of livestock directly translates to acute household food insecurity. Cattle represent the primary savings and capital for these families. Onuh (2023) notes that the destruction of livestock during farmer-herder clashes eliminates the raw material women need to run their milk businesses. This sudden loss of income forces families to reduce their food intake and often pulls children out of school.

A central theme in the literature is the stark contrast between the labor women provide and the assets they actually own. Das and Singh (2020) describe rural women as invisible workers whose massive contributions to agriculture are rarely recognized. Foundational feminist theory by hooks (1984) explains that economic systems often marginalize women by pushing their labor into the unpaid domestic sphere. Mukeku (2024) brings this into the modern dairy

context, noting that while women do the heavy lifting of processing and selling, the cultural ownership of the land and the cows almost always remains with the men.

This lack of ownership is tied to strict patriarchal rules that govern family dynamics. Gergen (1999) discusses how social constructs dictate behavior and limit individual agency. In pastoral communities, these constructs dictate that men hold the financial power. Mani et al. (2024) highlight that even when women earn money from milk sales, they rarely have the final say on how that money is spent. Sumangali and Maddileti (2025) found similar restrictive patterns, noting that economic participation does not automatically translate into social respect or decision making power for women. Nagasha et al. (2024) also report that husbands often control milk allocation, rationing it based on their own moods rather than the business needs of their wives.

To demonstrate the depth of this systemic exclusion, the following table maps the specific gender disparities regarding asset ownership and household decision making power.

Table 2: Gender Disparities in Dairy Asset Ownership and Household Decision Making

Indicator of Empowerment or Control	Empirical Finding	Source
Cattle Ownership	Husbands solely own the cattle in 68% of the surveyed pastoralist households.	Mani et al. (2024)
General Decision Making	85% of female respondents indicated that men make the major household decisions.	Mani et al. (2024)
Financial Independence	Only 32% of women pastoralists reported having any personal financial savings.	Mani et al. (2024)
Financial Valuation	48% of women felt their opinions on financial matters were not highly valued by their families.	Sumangali & Maddileti (2025)
Dairy and Banking Literacy	46% of women admitted they were not well versed in matters associated with dairy banking activities.	Sumangali & Maddileti (2025)
Control of Raw Materials	Men solely control milk allocation and often ration it, restricting women's processing capacity.	Nagasha et al. (2024)

The statistics presented in Table 2 paint a restrictive picture of the operational environment for dairy women. With 85% of major decisions controlled by men and 68% of cattle owned strictly by husbands (Mani et al., 2024), women operate essentially as laborers rather than business owners. The fact that nearly half of the women feel undervalued in financial matters and lack banking literacy (Sumangali & Maddileti, 2025) severely limits their adaptive capacity. When a crisis like cattle rustling occurs, women cannot easily secure bank loans or liquidate assets to recover because they have no legal claim to the property. This patriarchal structure forces women to rely on informal, high risk survival tactics rather than structural business adaptations.

1.8.4 Adaptive and Coping Strategies among Dairy Women

Faced with severe security threats and strict cultural limitations, dairy women employ various strategies to survive. Social exchange theory (Emerson, 1981) suggests that individuals adapt their behaviors based on the resources available to them and the power dynamics of their relationships. In the immediate aftermath of asset loss, women often resort to basic livelihood diversification. Badejo (2017) observes that pastoral women take up petty trading, artisanal work, and the utilization of local materials like cow dung for fuel to generate immediate cash. Samuel (2023) notes that these survival tactics are often reactive and symmetric, meaning they are short term defences against immediate poverty rather than long term solutions. Mani et al. (2024) point out that women frequently turn to backyard gardening and tailoring to supplement their income when dairy operations fail.

Moving beyond basic survival, collective action emerges as a crucial structural adaptation. Ponnusamy et al. (2020) highlight the immense success of Self Help Groups in empowering women. By pooling their meager resources, women can access microcredit, share transportation costs to safer markets, and negotiate better prices for their milk. Jagadeesha (2024) supports this, stating that participation in dairy cooperatives is a primary pathway for women to achieve financial stability in male dominated societies. Mukeyu (2024) notes that while women face systemic barriers even within cooperatives, joining these groups remains a vital strategy for building collective power and accessing training.

Personal agency and family dynamics also play a significant role in adaptation. Kumari and Tiwari (2025) found that a woman's assertiveness is critical to farm performance. Assertive women are better able to foster family cohesion, which creates an emotionally stable environment capable of weathering external shocks. Sumangali and Maddileti (2025) suggest that gaining slight economic independence through dairy farming allows women to negotiate for better social standing within the household over time.

Comparative studies from other conflict zones provide valuable lessons. Ng (2014) reports on an initiative in Afghanistan where dairy unions were used not only to empower women economically but to actively mitigate civil conflict. By providing a stable income and requiring cooperative labor, these unions reduced the economic incentives for local violence. Grounded theory (Glaser & Strauss, 1967) and narrative inquiry (Connelly, 2000) emphasize the importance of learning from these lived experiences. The success of women in Afghanistan and Kenya proves that with structural support, dairy women can move from surviving conflict to actively building peace and economic resilience.

The following matrix categorizes these various strategies, evaluating their mechanisms and overall effectiveness based on the reviewed literature.

Table 3: Typology and Efficacy of Local Adaptation Strategies Utilized by Dairy Women

Adaptation Strategy	Mechanism of Action	Strategy Type	Efficacy and Limitations	Source
Income Diversification	Engaging in petty trading, tailoring, and backyard gardening to supplement lost dairy income.	Short Term Survival	High immediate relief but low long term sustainability. Does not resolve the core dairy challenges.	Mani et al. (2024); Badejo (2017)
Joining Self Help Groups	Pooling financial resources and sharing market access risks through local women's groups.	Structural Adaptation	Highly effective for securing microloans and improving bargaining power. Limited by male resistance.	Ponnusamy et al. (2020); Mukeku (2024)
Utilizing Traditional Networks	Relying on informal social ties and community leaders for emergency support and information.	Social Adaptation	Provides temporary safety nets but fails to offer substantial financial capital or physical security.	Badejo (2017); Samuel (2023)
Value Addition	Processing raw milk into butter or ghee to extend shelf life and increase market value.	Economic Adaptation	Profitable but severely limited by lack of modern technology, time poverty, and male control of raw milk.	Nagasha et al. (2024); Jagadeesha (2024)
Assertiveness and Negotiation	Actively communicating and negotiating within the household to secure family	Psycho Social Adaptation	Improves family cohesion and farm performance, but requires overcoming deeply	Kumari & Tiwari (2025)

Adaptation Strategy	Mechanism of Action	Strategy Type	Efficacy and Limitations	Source
	support and resources.		ingrained patriarchal norms.	

Table 3 clearly illustrates a critical gap in the current response to rural insecurity. While women are highly resourceful, the majority of their accessible strategies (like income diversification and relying on traditional networks) are reactive survival tactics. These methods help families survive the week but do not protect the dairy business in the long run. The more effective structural adaptations, such as joining cooperatives or investing in value addition, are frequently blocked by a lack of capital, inadequate technology, and restrictive cultural norms. Therefore, local adaptation alone is insufficient without targeted institutional support to remove these specific barriers.

1.8.5 Government Support and Missing Policies

Despite the clear need for intervention, government policies frequently fail to support the adaptation strategies of dairy women at the grassroots level. The Nigerian government has initiated several policies, such as the Central Bank's backward integration policy and the proposed RUGA settlements, aimed at boosting domestic dairy production. However, Samuel (2023) criticizes these top down approaches as being disconnected from the realities of pastoralists. These policies often focus heavily on land acquisition and kinetic military security, ignoring the specific economic and social vulnerabilities of women. Badejo (2017) also notes a massive gap between policy formulation and actual implementation, observing that government responses are usually reactive rather than proactive.

There is a pressing need for gender transformative frameworks. The National Gender Policy (FMWA, 2006) advocates for the mainstreaming of women's needs into all sectors, yet the agricultural sector remains heavily male biased. Morrow (2017) argues that building true community resilience requires policies that specifically build the adaptive capacities of the most vulnerable groups. The Nigerian military has attempted to mainstream gender into its operations (Nigerian Army, 2019), but rural security deployments rarely include measures to protect the economic assets of pastoral women. Mukeku (2024) emphasizes that policies must go beyond simple inclusion and actively dismantle the systemic barriers that prevent women from owning assets and participating in leadership.

Summarily, the literature provides robust evidence that rural insecurity, exacerbated by climate change, devastates the dairy sector and disproportionately harms women due to entrenched gender inequalities. While studies from various regions document the ingenious ways women form cooperatives and diversify their incomes, the specific, localized adaptation strategies of dairy women in the conflict-ridden zones of Kaduna State remain underexplored. Existing research heavily details the causes of the farmer herder conflict but offers very little empirical data on how women sustainably maintain their dairy businesses amidst constant violence and cattle rustling. This highlights a critical research gap. Understanding the precise

coping mechanisms, financial strategies, and social networks utilized by these women is absolutely necessary for formulating effective, gender inclusive agricultural and security policies in Nigeria.

1.9 Summary of key Findings from the thematic literature review

This section provides a critical discussion of the themes and empirical evidence drawn from the literature review. The purpose of this discussion is to interpret what the existing research reveals about the daily realities of dairy women in conflict zones. By analyzing the intersection of security challenges, economic marginalization, and gender inequality, this discussion highlights the severe limitations of current local adaptation strategies. It also explains why structural interventions are absolutely necessary to secure the livelihoods of dairy women in Kaduna State.

1. The Reality of Security Threats on Dairy Livelihoods

The literature clearly establishes that the security crisis in Northern Nigeria is not a temporary disruption but a systemic collapse of the rural agricultural environment. Studies by Samuel (2023) and Onuh (2023) demonstrate that farmer herder conflicts, armed banditry, and kidnapping have fundamentally altered the landscape of dairy farming. The findings show that these threats do not just create fear but actively destroy the physical assets required for dairy production. When cattle are rustled or killed during conflicts, the primary source of capital for pastoral families vanishes overnight.

Furthermore, the research highlights a critical link between climate change and violent conflict. Badejo (2017) and Onuh (2023) provide empirical evidence that environmental degradation acts as a primary catalyst for insecurity. As drought conditions worsen and rainfall becomes erratic, pastoralists are forced to migrate outside of their traditional grazing routes to find water and fodder. This forced migration brings them into direct competition with sedentary farming communities over rapidly shrinking resources. The resulting violence directly paralyzes the dairy value chain. For dairy women, this means the environment is no longer safe enough to graze cattle locally, and the routes to urban markets are too dangerous to travel. The literature proves that insecurity and climate variability are twin forces that trap dairy women in a cycle of poverty and constant physical danger.

2. Economic Fallout and the Destruction of Value Chains

A major finding from the synthesized literature is the devastating economic impact that conflict has on the local dairy value chain. Muloi et al. (2018) and Samuel (2023) illustrate that insecurity forces women out of formal market structures and into highly volatile informal economies. When safe transport routes are cut off by banditry, women cannot sell their fresh milk in larger towns where prices are fair. Instead, they are forced to sell within their immediate, economically depressed settlements or rely on exploitative middlemen. This results in a massive loss of potential income.

The research also reveals the severe difficulties women face regarding value addition. Processing raw milk into products like butter and ghee is a primary method for extending shelf life and increasing profit margins. However, studies by Nagasha et al. (2024) and Jagadeesha (2024) confirm that women are severely restricted by a lack of access to modern processing technology. They rely on traditional, highly labor intensive methods that take a

physical toll on their bodies. When conflict causes displacement, women lose access to even these basic processing tools and safe, hygienic spaces.

This disruption leads to secondary crises in health and nutrition. As Badejo (2017) points out, the breakdown of infrastructure in conflict zones eliminates access to clean water and veterinary services. This creates massive sanitary risks, including the spread of zoonotic diseases through contaminated milk. Additionally, Das and Singh (2020) emphasize that the loss of dairy income directly translates to acute food insecurity at the household level. Because women are typically responsible for feeding the family, the destruction of their milk business forces them to drastically reduce household food consumption, which severely impacts the nutritional health of their children.

3. Gender Inequality and Resource Control

Perhaps the most critical finding discussed in the literature is the deep structural inequality that defines the dairy sector. The research consistently shows a massive disconnect between the labor women provide and the economic power they actually hold. Mukenku (2024) and Das and Singh (2020) describe women as the invisible workers of the agricultural economy. While women are responsible for the grueling daily tasks of milking, processing, and selling, they are systematically excluded from owning the core assets of the business.

The empirical data provided by Mani et al. (2024) confirms that cattle and land are overwhelmingly owned and controlled by men due to deeply entrenched patriarchal norms. This lack of ownership is the single biggest barrier to women's adaptation and resilience. Because they do not own the cattle, women cannot use them as collateral to secure bank loans. They cannot sell a cow to buy modern milk processing equipment or to relocate their business to a safer area. They are entirely dependent on their husbands for access to the raw materials of their trade.

Furthermore, the literature reveals that even when women successfully earn money from selling milk, they rarely control how that income is spent. Sumangali and Maddileti (2025) and Nagasha et al. (2024) highlight that male heads of households frequently dictate financial decisions and ration the amount of milk women are allowed to process. This dynamic strips women of their agency. It proves that economic participation does not automatically result in social empowerment. The literature clearly indicates that until these cultural rules are challenged and women are granted legal and social rights to own agricultural assets, their ability to survive and adapt to security threats will remain severely stunted.

4. Evaluating the Effectiveness of Local Adaptation Strategies

The literature review provides a clear picture of how dairy women attempt to survive amidst these overlapping crises. However, the findings suggest a strict division between short term survival tactics and long-term structural adaptations. Studies by Samuel (2023) and Badejo (2017) show that in the immediate aftermath of violence or asset loss, women rely on income diversification. They engage in petty trading, backyard farming, and tailoring to generate quick cash. While these actions highlight the incredible resilience and resourcefulness of pastoral women, the literature agrees that these are reactive measures. They are desperate attempts to prevent starvation rather than strategic business decisions designed to protect and grow the dairy enterprise.

In contrast, the literature identifies collective action as the most effective structural adaptation available to women. Ponnusamy et al. (2020) and Jagadeesha (2024) demonstrate that when women form Self Help Groups and dairy cooperatives, their adaptive capacity increases dramatically. Cooperatives allow women to pool their limited financial resources, share the costs of safe transportation to distant markets, and negotiate better prices as a united front. Furthermore, comparative studies from other conflict zones, such as the research by Ng (2014) in Afghanistan, prove that dairy unions can serve as powerful tools for peacebuilding. By providing stable, shared economic opportunities, these cooperatives reduce local tensions and elevate the social standing of women in conservative communities.

Despite the proven success of collective action, the literature also warns of significant barriers. Mukeku (2024) notes that patriarchal norms often discourage women from participating in public leadership roles or joining cooperatives without their husband's explicit permission. Additionally, a lack of formal education and banking literacy prevents many women from navigating the administrative requirements of formal cooperative societies. Therefore, the findings suggest that while cooperative models are the most viable adaptation strategy, they cannot succeed organically in hostile environments without targeted external support and gender sensitization programs for the entire community.

5. Institutional Failures and Policy Gaps

The final major theme extracted from the literature is the persistent failure of government institutions to protect and support dairy women. The findings indicate a profound disconnect between national agricultural policies and the lived realities of rural pastoralists. Samuel (2023) and Badejo (2017) criticize top-down government interventions for being overly focused on kinetic military responses or large-scale land acquisitions. These policies completely ignore the micro level economic needs of the women who actually run the local dairy supply chains.

The literature points out that government support for the dairy sector is heavily skewed toward large, formal processing companies. Informal markets, where the vast majority of women operate, receive almost no regulatory support, infrastructural investment, or security protection. Furthermore, while frameworks like the National Gender Policy exist on paper, the research by Mukeku (2024) and others shows that these policies are rarely enforced at the grassroots level. Development interventions often treat communities as a single unit, failing to recognize that resources channelled into a community are usually captured by men, leaving women marginalized.

The discussion of these findings reveals a clear consensus in the academic literature. The survival of the local dairy sector in Kaduna State depends entirely on the resilience of women. Yet, these women are fighting a battle on two fronts. They face extreme physical danger from armed conflict, and they face severe economic restrictions from patriarchal traditions. Their current adaptation strategies are brave but ultimately insufficient to overcome systemic violence and inequality. The literature confirms that true resilience will require a fundamental shift in how policies are designed, moving away from gender blind security measures toward frameworks that specifically empower women with legal rights, financial capital, and physical safety.

1.10 Recommendations

The study recommends that government agencies, development partners, and civil society organizations adopt a **gender-responsive and community-driven approach** to strengthening dairy women's resilience in Kaduna State. This should include the establishment of secure grazing corridors, conflict-resolution mechanisms, and early warning systems that specifically protect women's mobility and market access. Expanding climate-resilient infrastructures such as solar-powered boreholes, dedicated milk collection centers, and mobile veterinary services would directly enhance productivity and reduce women's exposure to conflict zones. Furthermore, structured financial inclusion programs, including access to microcredit and cooperative-based savings schemes, are essential to help women rebuild assets lost to insecurity and invest in safer value addition technologies.

Equally important is the need for **institutional reform and inclusive policymaking**. The federal and state governments should operationalize the *National Gender Policy (FMWA, 2006)* within agricultural and security frameworks to ensure women are integrated into decision-making, extension services, and dairy cooperative leadership. Partnerships between organizations like IFAD, FAO, and the National Assembly could support localized interventions that merge peacebuilding with livelihood restoration. Building female-led dairy cooperatives, expanding training in entrepreneurship and milk value chain management, and incorporating women's security needs into national pastoral policies will not only reduce gender inequality but also strengthen food security and promote sustainable rural development in Kaduna State.

References

- Adebayo, A. A. (2020). Livelihood resilience among dairy women in Nigeria. *Journal of Agricultural Economics*, 71(2), 257-272.
- Adeoye, A. (2020). Kidnapping and banditry in Nigeria: Causes and consequences. *Journal of Security Studies*, 9(2), 1-15.
- African Women's Development Fund. (2019). Women's peacebuilding in Africa: Lessons from the field. *Journal of Peacebuilding and Development*, 14(2), 147-162.
- Albert, I. O. (2017). Herdsmen-farmer conflicts in Nigeria: A critical analysis. *Journal of Conflict Studies*, 37(1), 34-50.
- Armed Conflict Location & Event Data Project (2023). *ACLED data export tool: Conflict data for Nigeria*. Published by: ACLED. Available at: <https://acleddata.com>
- Ayende, I. A. (2020). *An assessment of Nigeria's dairy sector: Challenges and opportunities for development*. *Journal of Agricultural Economics and Rural Development*, 6(1), 45-58.
- Badejo, A.F. (2017) 'Expanding the One Health Agenda: A Case of Pastoralists' Livelihoods and Health Seeking Behaviour in Kachia Grazing Reserve, Kaduna State, Nigeria'. (PhD Thesis or related publication).
- Béné, C. (2018). Resilience and adaptation in fragile contexts. *Journal of International Development*, 30(5), 761-775.
- Berger, P. L., & Luckmann, T. (1966). *The social construction of reality: A treatise in the sociology of knowledge*. Doubleday.
- Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Harvard University Press.
- Bronfenbrenner, U. (1992). Ecological systems theory. *Journal of Research on Adolescence*, 2(1), 1-18.

- Butler, J. (1990). *Gender trouble: Feminism and the subversion of identity*. Routledge.
- Central Bank of Nigeria (2019). *Guidelines for the implementation of the backward integration programme in the dairy sector*. Published by: Central Bank of Nigeria (Policy Document).
- Chambers, R., & Conway, G. (1992). *Sustainable rural livelihoods: Practical concepts for the 21st century*. Institute of Development Studies.
- Clandinin, D. J., & Connelly, F. M. (2000). *Narrative inquiry: Experience and story in qualitative research*. Jossey-Bass.
- Corniaux, C., Duteurtre, G., Dieye, P. N., & Pocard-Chapuis, R. (2014). *Les filières laitières en Afrique de l'Ouest: enjeux et perspectives*. *Revue d'élevage et de médecine vétérinaire des pays tropicaux*, 67(1), 3–12.
- Das, J., & Singh, A. (2020). Women Empowerment and Its Impact on Livelihood and Food Security of Households: A Review. *Current Journal of Applied Science and Technology*, 39(40), 85-93. DOI: 10.9734/cjast/2020/v39i4031108
- Emerson, R. M. (1981). Social exchange theory. *Annual Review of Sociology*, 7, 335-362.
- Enloe, C. (2000). *Maneuvers: The international politics of militarizing women's lives*. University of California Press.
- Falola, T. (1999). The colonial legacy in Nigeria. *Journal of Imperial and Commonwealth History*, 27(2), 157-176.
- Federal Ministry of Women Affairs (FMWA). (2006). *National Gender Policy*. Abuja, Nigeria.
- Food and Agriculture Organization (1988). *Dairy development in Nigeria*. Rome: FAO Animal Production and Health Paper Series.
- Food and Agriculture Organization (2018). *Dairy development's impact on poverty reduction, food security and nutrition*. Rome: FAO.
- Food and Agriculture Organization (2019). *The state of food and agriculture: Moving forward on food loss and waste reduction*. Rome: FAO.
- Food and Agriculture Organization (2020). *Gateway to dairy production and products*. Rome: FAO.
- Food and Agriculture Organization (2021). *Africa sustainable livestock 2050: Livestock sector brief—Nigeria*. Rome: FAO.
- Gergen, K. J. (1999). *An invitation to social construction*. Sage.
- Glaser, B. G., & Strauss, A. L. (1967). *The discovery of grounded theory: Strategies for qualitative research*. Aldine.
- hooks, b. (1984). *Feminist theory: From margin to center*. Pluto Press.
- IFAD. (2018). *Adaptation in fragile contexts*.
- International Crisis Group (2018). *Stopping Nigeria's spiralling farmer–herder violence*. Africa Report No. 262. Brussels: International Crisis Group.
- International Crisis Group (2020). *Violence in Nigeria's North West: Rolling back the mayhem*. Africa Report No. 288. Brussels: International Crisis Group.
- International Fund for Agricultural Development (2019). *Pastoralism and livestock development in West Africa*. Rome: IFAD.
- International Fund for Agricultural Development. (2018). *Rural development report: Fostering inclusive growth in fragile contexts*. Rome: IFAD.
- Jagadeesha, B. (2024). A Study on Women Economic Empowerment through Dairy Farming: Issues and Challenges. *Shanlax International Journal of Arts, Science and Humanities*, 12(S1-Oct), 155–159. <https://doi.org/10.34293/sijash.v12iS1-Oct.8299>
- Jagadeesha, L. (2024). *Smallholder dairy production challenges in low-income economies*.

- Kumari, A. & Tiwari, M. (2025). The role of assertiveness, family dynamics and cohesion in women-led dairy farm performance. *Journal of Family Business Management*, Vol. ahead-of-print No. ahead-of-print. <https://doi.org/10.1108/JFBM-01-2025-0022>
- Kumari, D., & Tiwari, S. (2025). *Gender and household negotiation in pastoral farming systems*.
- Mani, A., et al. (2024). *Pastoral livelihoods under insecurity: A study of Northern Nigeria*.
- Mani, J. R., Bello, M., Oladimeji, Y. U., & Olayiwola, F. (2024) 'Standard of living, gender dimensions and women empowerment among Fulani pastoralist in Kaduna State, Nigeria'. *African Journal of Agricultural Research*, 20(7), pp. 530-546.
- Mercy Corps (2022). *The economic costs of conflict in Nigeria*. Portland: Mercy Corps.
- Morrow, B. H. (2017). Community resilience: A study of adaptive capacities. *Journal of Environmental Studies*, 37(1), 1-12.
- Moser, C. (1993). *Gender planning and development: Theory, practice and training*. Routledge.
- Mukeku, C. M. (2024). *Women's Participation in Kenya Dairy Cooperative Decision-Making Processes*. (Doctoral dissertation, Walden University). Retrieved from <https://scholarworks.waldenu.edu/dissertations>
- Mukeku, W. (2024). *Gendered structures and cooperative leadership among dairy women in Africa*.
- Muloi, D., Alarcon, P., Ombui, J., Ngeiywa, K. J., Abdullahi, B., Muinde, P., Karani, M. K., Rushton, J., & Fèvre, E. M. (2018). Value chain analysis and sanitary risks of the camel milk system supplying Nairobi city, Kenya. *Preventive veterinary medicine*, 159, 203–210. <https://doi.org/10.1016/j.prevetmed.2018.09.010>
- Muloi, D., et al. (2018). *Market informality and women's vulnerability in dairy value chains*. *Frontiers in Veterinary Science*, 5, 201.
- Nagasha, I., et al. (2024). *Women and value addition in conflict-affected smallholder dairy systems*.
- National Gender Policy (FMWA). (2006). *Federal Ministry of Women Affairs and Social Development, Abuja*.
- Nagasha, J. I., Ocaido, M., Rajala, E., Abu Hatab, A., & Chiwona-Karltun, L. (2024). Gender-based approaches for improving milk safety, value addition, and marketing among smallholder livestock farmers. *Frontiers in Sustainable Food Systems*, 8, 1392020. <https://doi.org/10.3389/fsufs.2024.1392020>
- National Bureau of Statistics (2022). *Agricultural performance survey report*. Abuja: NBS.
- Ng, M. (2014, August). *Empowering Women and Mitigating Conflict in the Afghan Dairy Industry*. Food Tank. Retrieved from <https://foodtank.com/news/2014/08/stories-from-ifaddairy-cooperatives-help-stabilize-conflict-torn-areas-in-a/>
- Nigerian Army. (2019). Gender Desk: Mainstreaming gender in the Nigerian military. *Journal of Military Studies*, 5(1), 1-12.
- Ogundipe, S. (2018). Women's vulnerability to violence in Nigeria. *Journal of Gender Studies*, 27(3), 269-282.
- Omore, A., Baker, D., Kaitibie, S., & Fakhruddin, B. (2019). *Kenya dairy sector development: A rapid appraisal*. *African Journal of Agricultural and Resource Economics*, 14(1), 1–15.
- Onuh, P. (2023). *Climate variability and pastoral adaptation in Kaduna dairy communities*.
- Onuh, S.S. (2023). 'The Effects of Climate Change Induced Farmers-Herders Conflict on Fulani Women's Milk Business in Kaduna State, Nigeria: An Assessment of Climate Change Adaptation Strategies by Dairy Farmers'. *AKU: An African Journal of Contemporary Research*, 4(1).
- Organisation for Economic Co-operation and Development (2020). *Agricultural policy monitoring and evaluation 2020*. Paris: OECD Publishing.

- Ponnusamy, K., et al. (2020). *Empowering women through collective action in dairy farming*. *Indian Journal of Extension Education*, 56(2), 34–41.
- Ponnusamy, K., Sabikhee, L., Meena, G. S., & Sharma, P. (2020). Techniques for women empowerment in dairy. *Bhartiya Krishi Anusandhan Patrika*, 35(1-2). DOI: 10.18805/BKAP221
- Rosenblad, V. (Author), Garbi, S. & Höghammar, T. (Translation and editing). (2007). *Women, peace and security*. Women's International League for Peace and Freedom - Swedish section.
- Samuel, A. (2023). *Conflict, displacement, and livelihood loss among pastoral communities in Kaduna State*.
- Samuel, O.S. (2023). 'Adaptation Strategies of Fulani Women's Milk Business in the Face of Farmers-Herders Conflict in Kaduna State, Nigeria'. *AJAP-AMAMIHE Journal of Applied Philosophy*, 21(4).
- SBM Intelligence (2021). *The economics of cattle rustling in Northern Nigeria*. Lagos: SBM Intelligence (Research Report).
- Sumangali, C., & Maddileti, K. (2025). Social Empowerment of Women Through Dairy Farming: A Study. *International Journal for Multidisciplinary Research (IJFMR)*, 7(2). [Note: Publication date listed as March-April 2025 in the document]
- UN Women. (2020). *Gender and security in Nigeria: A review of the literature*.
- World Bank (2021). *Livestock and economic development in Africa: Policy perspectives*. Washington, DC: World Bank.