

**FARMER-HERDER CONFLICTS AND LIVELIHOOD NEXUS INSIGHTS FROM KWAHU
AFRAM PLAINS SOUTH DISTRICT OF GHANA**

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ABSTRACT

This paper sought farmers, herders, and cattle owners' insights into farmer-herder conflict dynamics and the effects of the conflicts on their livelihood assets. A sample size of 168 respondents comprising 147 farmers, nine cattle owners, and 12 settler herders was employed. After literature review, the study used a blend of semi-structured questionnaires, focus group discussions (FGDs), and interview guides to gather data from respondents. Data were analyzed using inferential statistical tools of the Statistical Package for Social Sciences (SPSS) version 21. The paper revealed three essential conflict causes related to crop destruction, water pollution, and competition for land, which are mostly non-violent. Farmers, herders, community members (e.g., youth), and cattle owners were the primary actors in the farmer-herder conflicts. Financial capital was most affected (38.1%), and natural capital (12.9%) was the least affected, with critical effects such as competition for water and land resources. It was concluded that the increasing prevalence of cattle crop destruction has the potential to cause food insecurity. The findings imply that attention to conflicts' effects on financial capital is needed to identify holistic interventions, which could be done through a multidisciplinary approach using expertise from different disciplines to achieve oriented results.

Keywords: Conflicts, farmer-herder, conflict dynamics, livelihood assets, natural resources

INTRODUCTION

Farmer-herder conflicts are global phenomena (see Abubakar, 2012; Aliyu, 2015; Blench, 2010; Enwelu et al., 2015; Olaniyi, 2015; Tonah, 2005, 2006) and have been recognized since the early beginning of agriculture (Fratkin, 1997). Across West Africa, the conflicts occur in northern Nigeria, southern and northern Mali, western Cameroon, northern Cote d'Ivoire, and southwest Burkina Faso (Aliyu, 2015; Blench, 2010; Benjaminsen & Boubacar, 2021; Chukwuma, 2019) and Ghana (Kyei-Poakwah, 2018; Amankwaa, 2019; Opoku, 2014). The conflicts challenge agriculture and will likely impact most people's livelihoods (see Baidoo, 2014; Kuusaana & Bukari, 2015; Stanley et al., 2017).

In Ghana, cases of farmers-herder conflicts have been in existence since the 1990s (Tonah, 2006) and have become more widespread in recent times (Alhassan, 2017; Boateng, 2015; Bukari, 2017; Dary et al., 2017; Kyei-Poakwah, 2018). Such conflicts have become a significant problem in many farming communities, especially Agogo, Kwahu Afram Plains, and Sekyere Afram Plains. It is estimated that an average of 18 violent conflicts occur between farmers and herders in conflict-prone areas (Baidoo, 2014), leading to loss of life, injuries, family dislocation, and property devastation (Abbass, 2014; Bukari, 2017; Kyei-Poakwah, 2018). The escalation of these conflict incidents tarnishes Ghana's image as a peaceful country (Baidoo, 2014; Opoku, 2014) and also undermines Sustainable Development Goal 16, which advocates for a significant reduction of all forms of violence and death rates everywhere).

The conflicts mainly result from increasing competition over access to and use of land and water, violating post-harvest grazing rules, cultivation of crops in herders' routes, blocked access by cattle to water sources such as riverbanks, crop destruction by livestock and cattle theft (Bukari, 2017; Stanley et al., 2017; Tonah, 2006). To mitigate the conflicts, successive governments have instituted different measures, such as "Operation Cow Leg", the establishment of cattle to manage the farmers-herders conflicts (Ahmed & Kuusaana, 2021). Operation Cow Leg" was launched in 1998 to expel the herders. A joint military and police task forces were formed to evict all cattle herders from the country (Agyemang, 2017; Tonah, 2005). However, these have not succeeded since the conflicts still prevailed or new ones occurred in other farming communities, including the Kwahu Afram Plains South District, where cattle rearing is ongoing (Kyei-Poakwah, 2018; Tonah, 2006).

The problem has far-reaching implications for many stakeholders, both in-country and beyond, raising concerns for many scholars and the government. Several studies have investigated the conflicts between farmers and herders in various parts of Ghana. However, these studies have primarily focused on a different context, analyzing the causes and effects of the conflicts (Amankwaa, 2019; Ahmed & Kuusaana, 2021; Kyei-Poakwah, 2018). This paper expands on existing studies that assess and provide a deeper understanding of the dynamics of the conflict. It explores how the conflict affects the livelihood assets of farmers and herders. The paper contributes to scholarship on farmer-herder conflicts and their effects on the livelihood assets of farmers and herders. What farmer-herder conflict dynamics prevail, and how do they affect the livelihood assets of the farmers and herders in

the Kwahu Afram Plains south district? The findings from this study are crucial for comprehending the reasons for the conflict and developing effective interventions to minimize conflict over natural resources in Ghana and beyond.

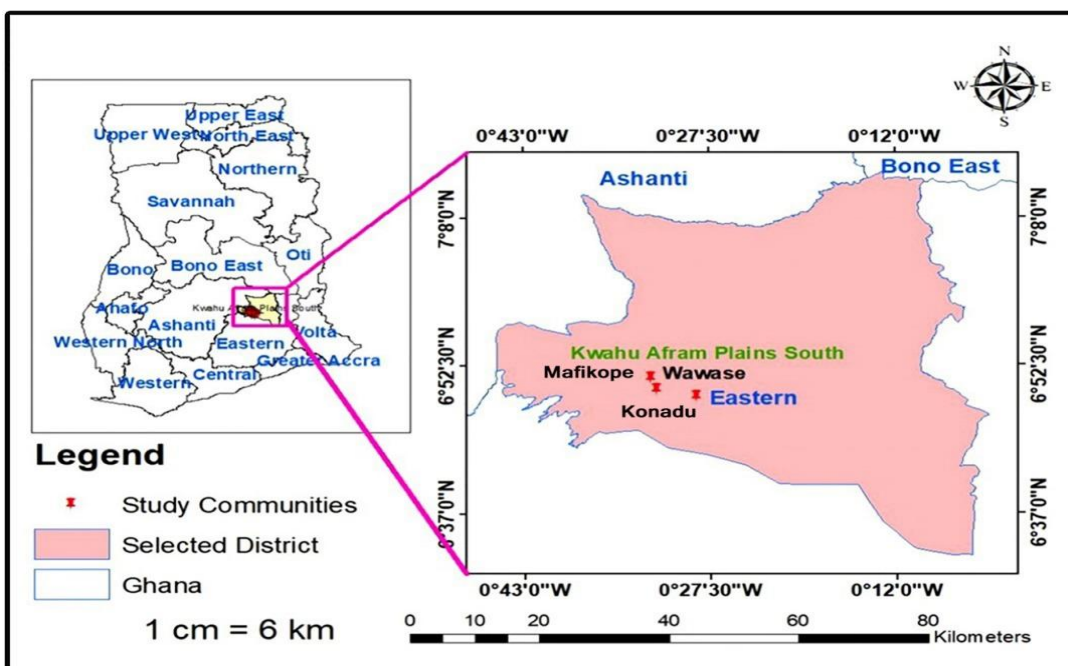
In the next section of the paper, we touch on the study's materials and methods employed. In the discussion section, we positioned the case in a broader debate on farmer-herder conflicts. Subsequently, results followed, touching on farmers', cattle owners', and herders' insights on conflict dynamics and effects on livelihood assets. Finally, we conclude with policy implications and suggestions for future studies.

METHODS

Study Area

The study was conducted in Mafikope, Wawase, and Konadu communities in the Kwahu Afram Plains South District of the Eastern Region of Ghana (see Figure 1). Kwahu Afram Plains' South District was selected purposely due to the predominantly reported cases of farmer-herder conflict (see Otu *et al.*, 2020; Otu, 2022; Tonah, 2006). The District is noted for its agricultural productivity, with the cultivation of food crops and cattle rearing being the primary sources of livelihood for the local communities (Ghana Statistical Service, 2014), thus informing its selection for the study.

Figure 1: Map of study communities in the Kwahu Afram Plains South District



Source: Mapping Unit, Kwahu Afram Plains South District Assembly, 2022.

The District lies within the north-western part of the Eastern Region on latitudes 6° 40' North and 7° 10' North and longitudes 0° 40' East and 0° 10' East with a total landmass of approximately 3,095 square kilometres. The District has an estimated population of 115,812, comprising 53.9% males and 46.1% females. The District

shares boundaries with the Kwahu Afram Plains North to the North, Kwahu South to the south, Volta River on the east, Sekyere East, and Ashanti-Akim districts to the west. Agriculture (crop farming, livestock production, poultry, and agro-processing) is the significant economic activity in the area, of which crop farming forms the most 93.3% active labour force in the District. The staple crops grown in the District include yam (*Dioscorea alata*), maize (*Zea mays*), cocoyam (*Colocasia esculenta*), plantain (*Musa sapientum*), beans (*Phaseolus vulgaris*), cabbage (*Brassica oleracea*), and groundnut (*Arachis hypogaea*). In contrast, tree crops like cashews (*Anacardium occidentale*), oranges (*Citrus sinensis*), and oil palm (*Elaeis guineensis*) are also grown mainly for commercial purposes (Ghana Statistical Service, 2014).

Research Design, Data Collection and Analysis

A cross-sectional research design was used to collect data from the study communities to provide a snapshot of respondents' views on the prevailing farmer-herder conflict. Cross-sectional studies provide data on a specific point in time and make it easier to examine relationships between variables (Levin, 2006; Bryman, 2012). The study also used descriptive research design to give the authors first-hand information on farmers' and herders' socio-demographic characteristics, conflict dynamics, and how the conflicts affect livelihood assets. Yin (2003) reported that descriptive research design describes a phenomenon or an intervention and details real-life situations.

From Table 1, a snowball technique was used as a referral to get access to cattle owners and settler herders who were not readily accessible in the study communities. With such referrals, 12 settler herders and nine cattle owners were identified as part of the study. Snowball sampling aids in identifying hidden or hard-to-reach populations and engaging them in a study (Atkinson & Flint, 2001). The sample size for the farmers was determined from the Yamane (1967) formula for calculating sample size at a 95% confidence level and 0.05 margin of error. The sample size was calculated using the population of farmers (1,020) in the three selected farming communities which formed the sample frame. Thus, $n = \frac{N}{1+N(e)^2}$. Where n = sample size, N = sample frame (population size), e = margin of error (0.05), and 1 = constant. The number of respondents selected from each community was estimated using 14.5% of the total estimated population (18 years and above) in each community. After assessing the sample sizes for the three study communities, availability sampling was used to engage farmers who were readily available and willing to participate in data collection following the inclusion criterion established. Koerber & McMichael (2008) reported that availability sampling allows researchers to engage respondents who are readily available and accessible to participate in a study.

Table 1: Selected respondents in the respective communities

Data collection instruments:	Survey	Focus Group Discussion	Interview

Communities of Respondents	Population in the community (18 years +)	Status of Selected Farmers (N=147)		Total (N=147)	Number of selected Cattle Herders	Number of Cattle Owners
		Female	Male			
Mafikope	341	19	30	49	12	9
Wawase	339	12	37	49		
Konadu	340	9	40	49		
Total	1,020	40	107	147		

Population data for the community members were sourced from the Kwahu Afram Plains South District Electoral Commission info sheet data (2020).

Before the data collection, an initial visit to the study area was conducted in September 2021 to establish contact with key informants (Assemblymen and leaders of the cattle herders) whose contributions were relevant to the data collection process. Kugbega & Aboagye (2021) reported that the mixed method of qualitative and quantitative data collection provides more insights into the phenomenon under study and enhances the triangulation of study findings. The paper employed a mixed qualitative and quantitative data collection approach to collect primary data from the respondents from November to December 2021. A semi-structured questionnaire, interview guide, and Focus Group Discussion (FGD) checklists were employed to gather the study data from the farmers, cattle owners, and settler herders. The FGDs were to ensure consistency, triangulate and validate the communities' farmers' and cattle owners' findings, and gain further insights into the prevailing farmer-herder conflicts. In addition, literature on farmer-herder conflict was reviewed from books, newspapers, internet-published articles, and journals to support the primary data. The quantitative data from the questionnaires were analyzed using inferential statistical tools of the Statistical Package for Social Sciences (SPSS) version 21. A Pearson Chi-square test analysis was performed to determine whether a significant difference existed between respondents' responses and those of their respective communities. The audio recordings from the interviews and FGDs were transcribed into raw data and analyzed using thematic content analysis, backed with respondent quotes. Kawulich (2004) explains transcription data as reading and re-reading transcripts and identifying differences and similarities.

Limitations of the Study

Two study limitations were the absence of female and nomadic cattle herders. The initial plan was to engage both male and female herders. However, feedback from the field revealed no female herders in the study, which aligns with Manu *et al.* (2014) and Adisa's (2012) assertion that cattle herding is male-dominated. Also, no nomadic cattle herders were available at the time of data collection, only settler herders. Nevertheless, these did not affect the data captured but are worth mentioning to guide future research.

RESULTS

Socio-demographic characteristics of respondents

Sixty-three per cent of the farmers were males, and 37% were females. The majority, 85% of the farmers, were over 25 years old, and 71% had attained formal education. Concerning origin, 53.1% were indigenes, and 46.9% were migrants, presenting almost equal distribution. Fifty-seven per cent of the farmers were married, and most 42.2% had a household size of 4-7 persons. Regarding occupation, all the respondents had farming as their primary occupation, and 33.3% had trading as their principal secondary occupation. Christianity was the leading 55.1% religion among the farmers, and most 43.2% earn GH¢ 100.00-300.00 as their monthly income. Regarding ethnicity, 37.4% of the respondents were Ewes, followed by Akan 23.8%, and the least 11.6% were Dagaaba (see Table 2).

Table 2: Demographic Characteristics of the Study Respondents

Variable	Response	Name of community			Total n(%)
		Kunadu n(%)	Mafikope n(%)	Wawase n(%)	
Gender	Male	30(61.0)	32(65.0)	30(61.0)	92(63.0)
	Female	19(39.0)	17(35.0)	19(38.8)	55(37.0)
	Total	49(100.0)	49(100.0)	49(100.0)	147(100.0)
Age in years	18-25	9(18.4)	4(8.2)	9(18.4)	22(15.0)
	26-35	17(34.7)	20(40.8)	13(26.5)	50(34.0)
	36-45	12(24.5)	14(28.6)	12(24.5)	38(25.9)
	46-55	8(16.3)	7(14.3)	6(12.2)	21(14.3)
	>55	3(6.1)	4(8.2)	9(18.4)	16(10.9)
	Total	49(100.0)	49(100.0)	49(100.0)	147(100.0)
Educational background	None	16(32.7)	8(16.3)	19(38.8)	43(29.3)
	Primary	15(30.6)	9(18.4)	8(16.3)	32(21.8)
	JHS	6(12.2)	24(49.0)	12(24.5)	42(28.6)
	SHS	10(20.4)	5(10.2)	7(14.3%)	22(15.0)
	Tertiary	2(4.1)	3(6.1)	3(6.1)	8(5.4)
	Total	49(100.0)	49(100.0)	49(100.0)	147(100.0)
Marital status	Single	15(30.6)	5(10.2)	19(38.8)	39(26.5)
	Married	25(51.0)	37(75.5)	21(42.9)	83(57.0)
	Divorce	6(12.2)	5(10.2)	7(14.3)	18(12.2)
	Widow(er)	3(6.1)	2(4.1)	2(4.1)	7(4.8)
	Total	49(100.0)	49(100.0)	49(100.0)	147(100.0)
Primary occupation	Farming	49(100.0)	49(100.0)	49(100.0)	147(100.0)
	Total	49(100.0)	49(100.0)	49(100.0)	147(100.0)
Secondary occupation	Civil servant	3(6.8)	6(16.2)	10(20.8)	19(14.7)
	Farmer	13(29.5)	11(29.7)	8(16.7)	32(24.8)
	Trader	17(38.6)	15(40.5)	11(22.9)	43(33.3)
	Informal	2(4.5)	4(10.8)	16(33.3)	22(17.1)

	Sector				
	Cattle Herder	6(13.6)	1(2.7)	1(2.1)	8(6.2)
	Student	3(6.8)	0(0.0)	2(4.2)	5(3.9)
	Total	49(100.0)	49(100.0)	49(100.0)	147(100.0)
Religion	Christian	28(57.1)	26(53.1)	27(55.1)	81(55.1)
	Islamic	16(32.7)	16(32.7)	15(30.6)	47(32.0)
	Traditionalist	5(10.2)	7(14.3)	7(14.3)	19(12.9)
	Total	49(100.0)	49(100.0)	49(100.0)	147(100.0)
Origin status	Migrant	18(36.7)	13(26.5)	38(77.6)	69(46.9)
	Indigene	31(63.3)	36(73.5)	11(22.4)	78(53.1)
	Total	49(100.0)	49(100.0)	49(100.0)	147(100.0)
Ethnicity	Akan	10(20.4)	11(22.4)	14(28.6)	35(23.8)
	Dagaati	7(14.3)	7(14.3)	3(6.1)	17(11.6)
	Dagomba	9(18.4)	4(8.2)	7(14.3)	20(13.6)
	Ewe	13(26.5)	24(49.0)	18(36.7)	55(37.4)
	Kusasi	10(20.4)	3(6.1)	7(14.3)	20(13.6)
	Total	49(100.0)	49(100.0)	49(100.0)	147(100.0)
Income level per month	GH¢ <100.00	14(29.2)	9(18.4)	15(30.6)	38(26.0)
	GH¢ 100.00-300.00	21(43.8)	22(44.9)	20(40.8)	63(43.2)
	GH¢ 400.00-600.00	8(16.7)	9(18.4)	8(16.3)	25(17.1)
	GH¢ 700.00-900.00	2(4.2)	5(10.2)	2(4.1)	9(6.2)
	GH¢ >1,000.00	3(6.3)	4(8.2)	4(8.2%)	11(7.5)
	Total	49(100.0)	49(100.0)	49(100.0)	147(100.0)
Household Size	1-3 people	18(36.7)	17(34.7)	20(40.8)	55(37.4)
	4-7 people	23(46.9)	19(38.8)	20(40.8)	62(42.2)
	8-10 people	7(14.3)	9(18.4)	6(12.2)	22(15.0)
	>10 people	1(2.0)	4(8.2)	3(6.1)	8(5.4)
	Total	49(100.0)	49(100.0)	49(100.0)	147(100.0)

Source: Field data, Kwahu Afram Plains South District, 2021

Respondents' Perception of Farmer-Herder Conflicts Dynamics in the Study Area

Farmer–Herder Conflicts Issues and Actors

The study identified three conflict issues prevailing in the study communities (see Table 3). These were crop destruction (78.9%), followed by water pollution at 14.3%, and competition for land at 6.8%. Most respondents (89.8%) in the Wawase mentioned crop destruction as a conflict issue. The chi-square value indicated that the difference in response to the three communities was statistically significant ($P=0.000$) in all the conflict issues. The findings from the cattle owners interviewed and the herders' FGDs also revealed conflicts between farmers and herders, with crop destruction being the most significant issue. In contrast, competition over land, water resources, and trade was reported as minor conflict incidences.

Table 3: Type of conflict issues prevailing in the community

Type of Conflict Issues	Name of Community (N=147)			Total n(%)	Df	Sig.
	Konadu n(%)	Mafikope n(%)	Wawase n(%)			
1. Competition for land	2(4.1)	4(8.2)	4(8.2)	10(6.8)		
2. Crop Destruction	43(87.8)	29(59.2)	44(89.8)	116(78.9)	4	0.0
3. Water pollution	4(8.2)	16(32.7)	1(2.0)	21(14.3)		00
Total	49(100.0)	49(100.0)	49(100.0)	147(100.0)		

Source: Field data, Kwahu Afram Plains South District, 2021

Results revealed that most farmers (40.1%) mentioned farmers, herders, community members (e.g., youth), and cattle owners as actors in the farmer-herder conflicts. Similarly, 34% suggested farmers and cattle herders, 15.6% stated farmers, cattle herders, and cattle owners, and 10.2% reported farmers, cattle herders, and cattle owners. The difference in the three communities' responses was statistically significant ($P=0.003$). According to the cattle owners and the herders, conflicts mainly occur between farmers and cattle herders. However, some cattle owners and individual community members (youths) often get involved. Thus, they believed that farmers and cattle herders were the primary actors in the conflict.

Nature of Farmer–Herder Conflicts

The study found that the nature of conflicts prevailing in the study communities was violent (32%), and the highest (61.9%) was non-violent. The chi-square value indicated that the association between the nature of farmer-herder conflict and responses in the three communities was statistically significant ($P=0.000$). The various reasons for describing the conflict as violent or non-violent are summarized in Table 4. The first three critical reasons for describing the conflict issues as violent according to the respondents were i) Herders attacked some community members (29.8%), ii) Some farmers were injured due to the conflicts (25.6%), and iii) Herders harassed (rape) women who go to the farm alone (17%). However, 65.9% of respondents viewed the farmer-herder conflict as non-violent because the conflicts are mainly verbal abuse, grievances, and disagreement between the farmers and the herders.

The FGDs with the herders and the cattle owners revealed that non-violent conflicts are more prevalent than violent ones, which aligns with the farmers' views. However,

a cattle herder whose cattle were injured by a farmer due to the conflict described the prevailing conflict as violent. As a 35 years cattle herder reported, "*Due to the conflict, the farmers sometimes injure our cattle with a cutlass when they meet them on their farms, destroying their crops, and the cases sometimes end up in the police station, so I perceived the conflict as violent*" – (FGD, Mafikope, November 2021).

Table 4: Farmers' perceived reasons for conflicts as violent or non-violent

Nature of Conflicts	Reasons	Total n (%)	
		Frequency (n)	Percentage (%)
Violent Nature	1. Some cattle shot by community members	4	8.5
	2. Some farmers /community members were injured during the confrontation	13	27.7
	3. Community members beat some herders.	4	8.5
	4. Some properties, e.g., food storage facilities, buildings destroyed	4	8.5
	5. Herders harass (rape) women who go to the farm alone.	8	17.0
	6. Herders attacked some community members.	14	29.8
	Total	47	100
Non-violent Nature	1. The conflicts are primarily verbal abuse, grievances, and disagreements between the farmers and the herders.	60	65.9
	2. Nobody has been injured or died due to the conflict.	11	12.1
	3. Farmers and herders do not use guns and cutlasses.	18	19.8
	4. Some herders often resolve the conflicts between the herders and the farmers.	2	2.2
	Total	91	100.0

Source: Field data, Kwahu Afram Plains South District, 2021

Even though farmers reported the violent and non-violent nature of conflicts, about 50% also reported conflicts escalating from non-violent to violent or de-escalating from violent to non-violent. The herders also confirmed these dynamics by reporting that conflicts often begin as verbal abuse and grievances, resulting in the use of cutlasses and guns. However, cattle owners contend that the conflict does not require transformation from one form to another. However, there is always verbal abuse, grievances, and disagreement among the farmers and the herders.

Causes and Effects of Farmer–Herder Conflicts

The respondents' perceived causes of farmer–herder conflicts and their effects are summarized in Table 5 in the Appendix. The result shows 14 diverse causes of farmer-herder conflicts with their respective effects. The three causes mentioned by most respondents in descending order were i) Competition over ownership of resources such as farmland, water, and grazing lands (n=134), ii) Cattle pollution or contamination of communities' water bodies (n=114) and iii) Competition over access to resources (farmland, water, and grazing land (n=111). Similarly, the lead-mentioned cattle crop destruction led to a reduction in the quantity of crop production and income generated from sales of crops, affecting household food security, failure of farmers to buy cattle products (meats, milk.) from the herders, and failure of farmers to sell food to the herders (n=143). The most negligible effect was 'loss of life', as shown in Table 5 (see Appendix).

The chi-square test found no statistically significant relationship between the communities' responses to causes such as sexual harassment of women by herders, denial of herders' access to resources (i.e. farmland, water, and grazing land), indiscriminate bush burning by cattle herders, cattle polluting' water bodies, unequal distribution of resources among herders and farmers and their effects (P -value >0.05 in each case and respective effects). In other words, the respondents' responses concerning the causes of farmer-herder conflicts and their effects in the three communities do not differ. However, causes such as farmers beating up herders or herdsman beating up farmers, cattle crop destruction, competition over access to resources, failure of herders to compensate farmers for crops damaged by their cattle, killing or injuring herders' cattle, and cattle theft, the chi-square test indicated that there is a significant relationship between respondents' responses and their communities (P -value <0.05 in each of causes and effects).

Interviews with the cattle owners and the herders FGD revealed that the major causes of conflicts between farmers and herders are: i) destruction of food crops by cattle, ii) farmers blaming herders for stealing their food crops, and iii) farmers injuring or shooting cattle. Both the herders and the cattle owners attributed the crop destruction to the activities of the nomadic herders, who do not stay around the area. The herders reported that the farmers disliked the settler herders because sometimes their cattle did not destroy their crops, yet the farmers blamed them.

*Our cattle do not destroy farmers' crops; most (about 70%) of the farm destruction activities are done by the nomadic herders; sometimes we meet them on field pasturing on farmers' crops, but we cannot stop because we fear them. We, the settler herders, belong to this community. We have nowhere to go when we intentionally allow our cattle to destroy farmers' crops, but sometimes, when we explain the farmers' situation, they disagree with us; they usually say, All cattle are cattle, which is why we usually fight with them—*said by 51 years old cattle herder, [FGDs, Mafikope, November 2021].

According to another respondent, the nomadic herders' cattle mainly destroy the crops because they always have many cattle, and due to their vast number, they cannot control them, destroying farmers' crops.

Sometimes, the nomadic herders from other places bring their cattle to this area, especially in the drying season, and in their quest to search for food, they destroy food crops. Although I am a cattle owner and sometimes my cattle destroy people's farms, my maize farm also got destroyed by these nomadic herdsman cattle not long ago, so despite our efforts in trying to resolve matters between the farmers and us, the Fulani herders come to worsening the situation. Sometimes, the local farmers misjudge the accusations and blame the settler herders for the destruction [Interview with a 37-year-old cattle owner at Konadu, November 2021].

The findings from the cattle owners' interviews and herders' FGDs indicated that the conflicts affect them. For instance, two cattle owners and six herders indicated that farmers sometimes kill or injure their cattle, resulting in conflicts and affecting income generation. According to a 29-year-old cattle herder, *"Just recently, a farmer refused to sell his plantain to me because he cannot sell his food to a herder who intentionally allows cattle to destroy their food crops"* [FGDs, Mafikope, November 2021]'.

Effects of the Conflicts on the Livelihood Assets of the Farmers and Herders

The result shows that farmer-herder conflicts affect the livelihood of the farmers and herders. Table 6 depicts how the conflict affects the diverse livelihood capitals of the farmers. On physical capital, 67% of the farmers asserted that burning food storage facilities due to conflicts results in farmers' limited access to food storage facilities. Thirty-three per cent also stated that the destruction of infrastructures, such as buildings, led to the loss of household items, such as the collapse of the building and ripping off the roof of mud houses. Also, 97% of the respondents stated that natural capital, such as land and water resources, is the focus of the conflicts due to competing claims. Regarding social capital, 83% of the farmers mentioned that the conflicts had brought tension and fear among farmers, especially women, which hindered their willingness to go to the farm alone and destroyed the cordial relationship between farmers and herders. Forty-two per cent of the farmers affirmed that the conflict has led to human injury, affecting human capital, and 20% indicated that the conflicts led to the imprisonment of people.

Regarding the effect of the conflicts on financial capital, 87% of the respondents asserted that the conflict had reduced the income generated from farming because they could not obtain enough income from the crops due to crop destruction. Some 13% of the respondents reported that the conflicts led to incurring debt.

Table 6: Livelihood assets affected by farmer-herder conflicts

Livelihood Asset Affected	Frequency (%)
<u>Physical Capital</u>	
<ul style="list-style-type: none"> Burning of food storage facilities due to conflicts results in farmers' limited access to food storage facilities 	98(67)
<ul style="list-style-type: none"> Destruction of infrastructure, such as buildings, led to the loss of household items, such as the collapse of buildings 	49(33)

and the ripping off of the roofs of mud houses.

Natural Capital

- The conflicts focus on land and water resources due to competing claims. 143(97)
 - Due to the conflicts, the herders often move their cattle to graze on the forestland, affecting, thus, the sustainability of the forest resources 4(3)
-

Social Capital

- The conflicts had brought tension and fear among farmers, especially women, which hindered their willingness to go to the farm alone and destroyed the cordial relationship between farmers and herders. 122(83)
 - Farmers want to refrain from selling food or buying cattle products to herders. 25(17)
-

Human Capital

- The conflict has led to human injury. 62(42)
 - The conflicts lead to the displacement of family members. 56(38)
 - Conflicts led to the imprisonment of people. 29 (20)
-

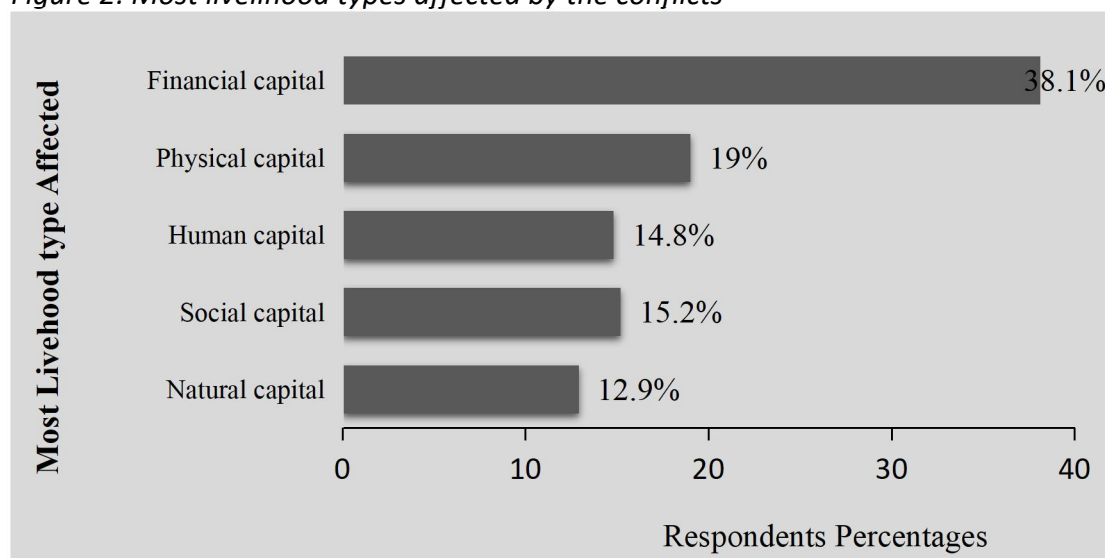
Financial Capital

- The conflict had reduced the income generated from farming. 128(87)
 - Leading to incurring debt. 19(13)
-

Source: Field data, Kwahu Afram Plains South District, 2021

The result revealed that the livelihood asset most affected by the conflict was financial capital (38.1%), followed by physical capital (19%) and minor natural capital (12.9%). From the FGD with the herders and the cattle owners interviewed, farmer-herder conflicts affect their livelihood assets, especially their finances. According to them, their source of livelihood is cattle rearing; however, the conflict has made it difficult for them to obtain the income they are supposed to get.

Figure 2: Most livelihood types affected by the conflicts



Source: Field data, Kwahu Afram Plains South District, 2021

From the perspective of 43 years cattle owner interviewed,

I had 25 cattle, but due to the conflicts, I sold 10 of them and gave the rest to a friend somewhere else because I needed my peace, even though I could have gotten income to contribute to livelihood if I still rear them here [Interview with cattle owner Wawase, November 2021].

"Some of our cattle were injured and killed by some communities' farmers due to the conflict, which affected our capital." Said a 27-year-old cattle herder – [FGDs, Mafikope, November 2021].

DISCUSSION

Respondents' Perception of Farmer-Herder Conflicts Dynamics in the Study Area

Previous studies in Ghana reported conflict between farmers and herders in farming communities (Alhassan, 2017; Kyei-Poakwah, 2018; Otu *et al.*, 2020). Similarly, the current paper found conflict between farmers and herders related to crop destruction, water pollution, and competition for land. The chi-square test indicated a statistically significant difference in the responses to the three communities concerning the conflict issues. This could be due to the differences in the livelihoods of the community members.

Violent conflicts mostly prevail among farmers and herders in most farming communities in Ghana. However, the current study depicts otherwise; violent and non-violent conflicts exist in the area, but non-violent conflicts are higher (61.9%). This was so because the conflicts were mainly verbal abuse, grievances, and disagreement among the farmers and the herders. Understanding the evolving nature of these conflicts allows policymakers to adopt long-term strategies for curbing these conflicts. The association between the nature of conflict and the respondents' communities was statistically significant, indicating that the nature of the conflicts varies from community to community. The highest non-violent conflict is inconsistent with a similar study by Dosu (2011) in Ghana, who observed violent conflicts between farmers and herders in the Asante Akim North District. Given the prevalence of violent and non-violent conflicts, policies should focus on establishing formal mechanisms for conflict resolution that emphasize dialogue and mediation. Local governments and community leaders can facilitate regular meetings between farmers and herders to address grievances and foster better communication, thereby reducing tensions before they escalate.

Farmers, herders, community members (e.g. youth), and cattle owners were mentioned by the highest 40.1% of the respondents as actors involved in the farmer-herder conflicts. The finding conforms to Kyei-Pokuah (2018) who observed that herders, farmers, community youth groups, and cattle owners are involved in farmer-herder conflicts in Ghana. Their activities revolve around the conflict, and they are more interested in protecting their crops, cattle, and properties against the devastating effects of the conflict. The involvement of these actors in the conflicts

implies that these stakeholders should be engaged in the conflict resolution process and ensure their voices are heard. At the same time, a statistical difference was observed between respondents' communities and their responses on the actors involved in the conflict ($P=0.003$), indicating that the study communities perceived the conflict actors differently. The current paper revealed diverse causes of farmer-herder conflicts and their respective effects. Cattle crop destruction was reported as the most significant cause (97.2%), reducing the quantity of crop production and income generated from sales of crops and affecting household food security. While herders disobeying communities' authorities and rules were the minor cause (21.8%), it led to under-development in the study communities. The study implies that policies aimed at sustainable land and resource management are critical, given crop destruction is identified as the most significant cause of conflict. Even though cattle crop destruction was reported as the leading cause, the chi-square test indicated a significant relationship between respondents' responses and their study communities. This finding may imply that respondents in each community have different views about cattle crop destruction as a cause of farmer-herder conflict. As Shettima & Tar (2008) and Davidheiser & Luna (2008) cited, the farmer-herder conflict has existed in Africa for centuries, but the reasons for its occurrence varied. The results of this study provide empirical evidence that can inform policymakers about the specific dynamics of farmer-herder conflicts in different communities. By recognizing the varying perceptions of conflict causes and actors, policies can be tailored to address each community's unique challenges.

Effects of the Conflicts on the Livelihood Assets of the Farmers and Herders

The results of this study provide valuable insights into how farmer-herder conflicts impact various livelihood assets, including natural, physical, human, financial, and social capital. The findings are critical for policymakers to develop targeted interventions that address the root causes of conflict while supporting the livelihoods of affected communities. Sunderlin *et al.* (2005) refer to livelihood as activities and assets that determine people's living, including natural, physical, human, financial, and social capital. Ramcilovic-Suominen *et al.* (2010) noted that people live better with enough livelihood assets (natural, human, physical, social, and financial). Some scholars (Out *et al.*, 2020; Tonah, 2006) reported that rural livelihood in Ghana is affected by conflict between farmers and herders. Not surprisingly, the current study shows that farmer-herder conflicts affect farmers' and herders' livelihoods, as reported by 97% of the respondents. The findings suggest that policymakers should develop and implement comprehensive conflict management policies that establish formal conflict resolution mechanisms that encourage dialogue between farmers and herders since the conflicts adversely affect their livelihoods. Financial capital was the most livelihood asset affected by the conflict, and social capital was minor; this may be linked to the fact that most farmers' income generation from food crops was reduced due to the cattle crop destruction and loss of herders' income due to cattle injury or killing of cattle. The findings agree with Opoku (2014) that farmers in non-conflict areas earn more income than farmers in conflict areas. The significant impact of conflicts on financial capital, mainly through reduced income from food crops, suggests the need for

targeted livelihood support programmes. Policymakers should consider implementing initiatives that provide financial assistance or alternative income-generating opportunities for farmers and herders affected by conflict.

Due to the burning of food storage facilities, farmers' limited access to food storage facilities was reported as the significant effect of the conflict on physical capital, and tension and fear among farmers, especially women, were found to be the significant conflict's effects on social capital. At the same time, the competition for land and water resources and the injury of humans led to conflicts that affected natural capital and human capital, respectively. At the same time, reduced income generated from farming due to crop destruction was found to be the leading effect of financial capital. The findings clearly show that during conflicts between farmers and herders, communities, especially farmers, and herders' livelihood activities and assets, including natural, physical, human, financial, and social capital, are also affected. Abbass (2014) and Okoli & Atelhe (2014) reported that farmer-herder conflicts lead to the loss of communities' livelihood activities and assets, which implies that managing conflicts between farmers and herders is crucial to improving communities' livelihood assets and activities.

CONCLUSION AND IMPLICATIONS

Farming and herding are livelihood options in an agricultural economy, contributing significantly to food security. However, the farmer-herder conflict has become a significant challenge in many farming communities worldwide. The current paper examined farmers' and herders' insights into the conflict dynamics (issues, nature, actors, causes, and effects) and analyzed the effects of the conflicts on their livelihood assets. The study concludes that conflict between farmers and herders is related to crop destruction, water pollution, and competition for land. The nature of farmer-herder conflicts is both non-violent and violent. However, non-violent conflicts constitute a higher form of conflict since most of the conflicts are in the form of verbal discourse. The study revealed diverse causes of farmer-herder conflicts and their respective effects. Cattle crop destruction was reported as the most significant cause that reduced the quantity of crop production and income generated from crop sales, and it affected household food security. Herders' disobeying communities' authorities and rules were the minor cause of under-development in the study communities. Farmers, herders, community members (e.g., youth), and cattle owners were the primary actors in the farmer-herder conflicts. The farmer-herder conflicts affect the communities' members and livelihood assets, with the most affected livelihood assets being financial and minor natural capital. Most farmers depend on food crops as their sources of income; hence, the destruction of farmers' crops due to conflicts affects their sources of income. The increasing prevalence of cattle crop destruction causes food shortages, leading to food insecurity and undermining the achievement of the Sustainable Development Goal (goal 1- end hunger).

The study recommends that efforts to prevent, manage and minimize farmer-herder conflicts should focus on the following: first, development workers and researchers should critically brainstorm and assess how crop destruction, water pollution, and

competition for land could be addressed since they are the primary conflict issues identified in the study. Second, development workers, researchers, and policymakers in the agricultural sector and natural resources arena should further assess the causes and effects mentioned by the respondents at different study areas or another level. Such action could help to identify more intervention spaces to improve natural resource conflicts at the micro-level. Third, peace and conflict researchers should pay close attention to conflicts' effects on financial capital to identify holistic interventions to prevent or minimize such effects since it is the most livelihood asset affected by the conflict, using multidisciplinary expertise and approaches to achieve results. Fourth, the local arm of government (the District Assembly) needs to create alternative livelihoods, such as mushroom cultivation and snail rearing, for the communities' members, especially farmers, to support their livelihood. This could help diversify communities' members' income loss through cattle crop destruction, affecting their financial assets.

Ethical Approval

The current paper strictly observed ethical issues such as confidentiality, anonymity, and informed consent due to the sensitive nature of the study. Before data collection began, ethical approval was sought from the study communities' opinion leaders (Chiefs, Assemblymen). The respondents' consent was sought, and their voluntary participation rights were respected. In terms of anonymity, the participants' privacy was ensured by removing their names, phone numbers, and other identifiers from the questionnaire. The study aims, objectives, and the risks involved were explained to the respondents. Finally, the reference list acknowledged all secondary data from other materials such as journals, articles, papers, and books.

Conflict of interest

There was no potential conflict of interest reported by the authors.

Availability of Data

The data supporting this study's findings will be made available at the request from the corresponding author.

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Appendix*Table 5: Causes of farmer–herder conflicts and their effects*

Causes	n(%)	Effect	Name of Community			Total n (%)	df	Sig.
			Konadu n (%)	Mafikope n (%)	Wawase n (%)			
1. Sexual harassment of women by herders	48(33.0)	i) Women are afraid to go to the farm alone.	14(29.2)	16(33.3)	18(37.5)	48(100)	4	0.140
2. Farmers beating up herders or herders beating up farmers	84(57.1)	i) Additional costs for treatment (e.g., hospital and medical costs).	1(5.9)	5(29.4)	11(64.7)	17(100)	8	0.000
		ii) Loss of life	0(0.0)	1(100.0)	0(0.0)	1(100)		
		iii) Injury of people.	9(50.0)	8(44.4%)	1(5.6)	18(100)		
3. Cattle crop destruction	143(97.2)	i) Reduces the quantity of crop production.	14(29.2)	16(33.3)	18(37.5)	48(100)	18	0.000
		ii) Reduces income generated from sales of crops.	25(0.0)	24(30.0)	36(45.0)	80 (100)		
		iii) Affects household food security.	1(33.3)	2(66.7)	0(0.0)	3(100)		
		iv) Farmers do not buy cattle products (meats etc.) from the herders.	2(50.0)	2(50.0)	0(0.0)	4(100)		
		v) Farmers refuse to sell food to the herders.	7(87.5)	0(0.0)	1(12.5)	8(100)		

4. Competition over access to resources (farmland, water, and grazing land)	111(75.5)	i) Herders do not have access to any resources (farmland, water, and grazing land) in this community.						
			8(15.4)	21(40.4)	23(44.2)	52(100)	8	0.000
		ii) Degradation of resources (farmland, water, and grazing land)	7(63.6)	4(36.4)	0(0.0)	11(100)		
		iii) Scarcity of resources (farmland, water, and grazing land)	20(41.7)	11(22.9)	17(35.4)	48(100)		
5. Competition over ownership of resources (farmland, water, and grazing land).	134(91.1)	i) Degrades resources (farmland, water, and grazing land)	27(37.0)	20(27.4)	26(35.6)	73(100)	4	0.027
		ii) Generate tension among farmers and herders.	7(53.8)	4(30.8)	2(15.4)	13(100)		
		iii) There is a need for nomad herders to have access to farmlands.	19(39.6)	13(27.1)	16(33.3)	48(100)		
6. Denial of herders' access to resources (farmland, water, grazing land).	88(60.0)	i) It affects the social relationship between herders and farmers.	6(37.5)	7(43.8)	4(18.8)	17(100)	12	0.156

7. Defecation of cattle on communities' roads.	88(60.0)	i) The disease outbreak (e.g., malaria, cholera pandemic)	15(60.0)	7(28.0)	3(12.0)	25(100)	6	0.011
		ii) Environmental pollution	21(33.3)	17(27.0)	25(39.7)	63(100)		
8. Indiscriminate bush burning by cattle herders	70(60.0)	i) Affects the vegetation cover of land.	2(40.0)	1(20.0)	2(40.0)	6(100)	14	0.057
		ii) Burning of food crops and storage facilities	14(45.0)	18(55.0)	15(0.0)	47(100)		
		iii) Loss of income generated from food crops	6(35.3)	8(47.1)	3(17.6)	17(100)		
9. herders need to be able to compensate farmers for crops damaged by their cattle.	96(65.3)	i) Hurts farmers' and herders' social relationship	13(27.7)	14(29.8)	20(42.6)	47(100)	14	0.000
		ii) Loss of income	21(54.2)	14(41.7)	6(4.2)	41(100)		
		iii) Refusal to sell food to the herders	5(62.5)	1(12.5)	2(25.0)	8(100)		
10. Cattle pollution or contamination of communities' water bodies	114(77.5)	i) It affects the community's drinking water source, leading to disease outbreaks (e.g., cholera pandemic)	42(36.8)	40(35.1)	32(28.1)	114(100)	4	0.064

11. Killing or injuring herders' cattle and cattle theft	96(23.8)	i) Causes loss of income generated from cattle rearing.	12(30.8)	6(30.8)	15(38.5)	33(100)	8	0.036	
		ii) Generate fear and tension among herders to take cattle to bushes and search for food.	2(100.0)	0(0.0)	0(0.0)	2(100)			
12. Cattle herders disobeying communities' authorities and rules	32(21.8)	i) It affects farmers' and herders' social relationships	0(0.0)	2(100.0)	0(0.0)	2(100)		14	0.000
		ii) Under-development in the community	3(12.5)	5(20.8)	16(66.7)	24(100)			
		iii) Misunderstanding and confusion among farmers and herders	0(0.0)	1(50.0)	1(50.0)	2(100)			
		ii) Farmers refuse to sell food to the herders.	1(25.0)	2(50.0)	1(25.0%)	4(100)			
13. Damaging properties such as	58(39.4)	i) Financial loss	17(66.7)	10(16.7)	15(16.7)	42(100)			
		ii) Loss of missed days of work	7(77.8)	1(11.1)	1(11.1)	9(100.0)			

buildings			iii) Farmers do not buy cattle products (meats etc.) from the herders.	1(20.0)	3(60.0)	1(20.0)	5(100.0)		
			iv) Farmers refuse to sell food to herders.	0(0.0)	1(50.0)	1(50.0)	2(100.0)	12	0.036
14.	Unequal distribution of resources among herders and farmers	46(31.3)	i) Minimizes the cooperative relationship between farmers and herders.	15(32.6)	20(43.5)	11(23.9)	46(100)	4	0.097

Source: Field data, Kwahu Afram Plains South District, 2021