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Farming with the Forest: Agriculture and Conservation Synergy in Ghana's Western Wildlife Corridor

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Abstract

This study explores farmers' role in the conservation of the Western Wildlife Corridor and associated Community Resource Management Areas in Ghana. Through focus group discussions and key informant interviews, it was found that local communities possess a deep understanding of the corridor's ecological, economic, and cultural values. Farmers identified a wide range of ecosystem services, including provisioning (e.g., firewood, fruits, construction materials), regulating (e.g., climate regulation, water purification), cultural (e.g., traditional knowledge, spiritual value), and supporting services (e.g., soil fertility, pollination). This knowledge has positively influenced the widespread acceptance of community-based natural resource management programmes as conservation tools. Despite facing land-use pressures from commercial farming, grazing, logging, and mining, communities demonstrate a strong commitment to conserving the wildlife corridor, motivated by intrinsic, cultural, and heritage values of biodiversity. Farmers' tolerance of wildlife—despite crop raiding and livestock depredation—is underpinned by cultural beliefs, especially in communities where wildlife are totemic animals. However, delayed or absent compensation for wildlife-related losses remains a critical concern that threatens long-term community support for conservation efforts. Conservation initiatives such as the Modified Taungya System (MTS), green firebelts, and capacity-building under national projects have reinforced local participation. The study highlights that the success of community-based conservation projects stems from collaborative governance structures involving local farmers, forestry and wildlife authorities, and NGOs. However, sustaining these gains requires continued investment in conservation-compatible livelihoods and prompt compensation mechanisms. The findings suggest that integrated landscape management, when informed by local knowledge and supported by inclusive conservation policies, can harmonize agricultural production with biodiversity conservation. Future research is recommended to explore land tenure dynamics in the WWC, particularly regarding commercial land acquisition, to inform sustainable land use planning.

Key Words: *Farmers, Agriculture, Conservation, Wild Corridors, Ghana*

Introduction

As land-based activities, agriculture and wildlife conservation are increasingly becoming conflicting land use enterprises as human population surges (Shackelford et al. 2015; Fischer et al. 2017; Egli et al. 2018). This kind of conflict is not only detrimental to biodiversity conservation worldwide but inimical to economic development, food security and sustainable resource use (Watson et al. 2019). The relationship between agriculture and wildlife conservation is complex and multifaceted, particularly in the context of land use. As agriculture expands to meet the growing global demand for food, fiber, and fuel, natural habitats are increasingly converted into farmland, leading to significant shrinkage of wildlife habitats and populations (Ullah & Shabir, 2023; Ortiz et al., 2021). Agricultural activities influence land use patterns, affecting habitat availability, connectivity, and ecosystem health. However, agriculture also has the potential to support wildlife conservation through sustainable and integrated land management practices (Rehman et al., 2022; Williams et al., 2021; Kremsa, 2021).

Recent studies indicate that the main driver of land use and land cover change in Africa is change in agricultural practices through reduction in fallow duration and expansion of commercial agriculture to meet the ever-increasing food demand (Assede et al., 2023; Mala et al., 2020; Gondwe et al., 2019). The consequences of these changes include the loss of vegetation cover, soil erosion, and reduction of agricultural yields in some areas in the continent (Assede et al., 2023). According to Ortiz et al. (2021), shifts in forest cover in Africa could be linked to poverty levels of the population and the need for cultivated land, particularly with the introduction of marked-oriented agriculture systems.

Denudation of Ghana's forest cover has been massive in the last three decades with protected forest reserves suffering average annual deforestation rates of 0.7%, 0.5%, 0.4%, and 0.6% for the periods 1990–2000, 2000–

2005, 2005–2010 and 2010–2015, respectively (FOA, 2015). This process diminishes biodiversity and disrupts ecosystems, making it challenging for both wildlife and cultivated crops to thrive. Forest resources contribute more than one-third (38%) of the income of Ghana's forest-dependent rural population and about 6% of annual Gross Domestic Product of the country (Acheampong et al., 2019; Adjei et al., 2014). With the support of government policies, commercial agriculture is thriving steadily in Ghana and more land is being converted into farms. This makes it difficult to make new cases for the creation of protected areas in the country. The decline of the resource will impact on the livelihoods of those who depend directly on the forest and the economy of the country. If the current rate of deforestation persists, Ghana's forests could completely disappear in two and a half decades time (Boafo, 2013).

To restore degraded forest reserves (protected areas), farmers are allowed to cultivate food crops in affected reserves. This is done under an arrangement known as modified taungya system (MTS). The MTS is an agroforestry system in which during the initial three years of cultivation, farmers are allowed to grow food crops in the allies of planted tree seedlings. The farmers tend both the trees and food crops until the trees form a closed canopy and then they stop growing food crops. However, the farmers continue to tend the trees until they mature. This makes arable land available to landless farmers, but it reduces biodiversity by clearing indigenous species and planting only single economic species in the space (Acheampong et al., 2016).

Another means to curb deforestation is to find an effective way to balance agriculture and biodiversity conservation to achieve conservation goals and agricultural outcomes. This will involve identifying and reforming farming methods that involve total vegetation clearance in favour of single crop cultivation and excessive use of agrochemicals (Dudley et al., 2017; Baudron & Giller, 2014).

Although most rural households keep some sort of livestock, livestock farming is adjunct to crop farming in Ghana. In the Savannah zones, cattle, Sheep, goats and poultry are kept by many households as social security and only sold during household emergencies (Aketemah, 2018). Livestock farming, particularly cattle, has become commercial and widespread in recent times in the savanna agroecological zone. Apart from cattle owned by local farmers, nomads come into northern Ghana from the Sahelian countries such as Niger and Mali to look for better grazing areas, water sources or to sell some animals at international markets (Boesen & Marfaing, 2014; Azarya, 2001). The increasing number of animals creates a new wave of environmental degradation through overgrazing and pollution of water sources for human consumption. Herder-farmer conflicts are also becoming a major security threat as livestock numbers increase. In places where there are forest reserves or wildlife corridors, the herdsmen concentrate grazing (or even settle) in those protected areas to avoid trouble with farmers (Agana et al., 2018). This practice degrades the protected areas and causes biodiversity loss.

The Western Wildlife Corridor (WWC) is part of the greater Mole Landscape linking the Mole National Park in Ghana and the Nazinga Game Ranch in Burkina Faso. The corridor is part of the northern Ghana elephant range, which has the eastern corridor to the east at the border with Togo, and the Nandom range at the extreme north-west of Ghana (Wildlife Division 2000; Blanc et al. 2003). The corridor since its creation has been extended westward to include areas between the Mole National Park and the Gbele Resource Reserve (Majam et al., 2017). It encompasses the sub-watersheds of the main tributaries of the Sissili and Kulpawn Rivers that flow into northern Ghana from Burkina Faso. The corridor contains several forest reserves including Sissili North, Chiana Hills, Sissili Central, Bepona, Gia, Fumbisi, Ghira, Tumu, Mawbia, Ambalara, Kulpawn Headwaters, and Kulpawn Tributaries Forest Reserves. Wildlife protected areas in the corridor are Gbele Resource Reserve and Mole National Park. The Corridor also encloses several hill ranges - the Minjali, Pudo and Chiana hills as well as sacred groves of religious significance that are protected by cultural and traditional norms (Majam et al., 2017). The WWC covers an area of about 3,713km^2 and the distance along the length from Mole National Park to Nazinga Game Ranch is about 143 km. The corridor engulfs over one hundred communities which are mainly farming villages (Majam et al., 2017). The farmers cultivate mainly annual crops including millet (*Pennisetum glaucum*), sorghum (*Sorghum bicolor*), white beans (*Phaseolus vulgaris*), sesame (*Sesamum indicum*), maize (*Zea mays*), yam (*Dioscorea spp*), cassava (*Manihot esculenta*) and groundnuts (*Arachis hypogaea*). The area is therefore important for both agriculture and biodiversity conservation.

This study was conducted to understand farmers' perception about having to combine agriculture and conservation efforts amidst increasing land hunger and commercial agriculture. The specific objectives include: i) to assess farmers' knowledge of the ecological importance of the wildlife corridor; ii) to assess farmers' acceptance of wildlife as an integral part of their farm space and human-wildlife conflicts; iv) to find out if farmers are still ready to accommodate the wildlife corridor, and v) identify any efforts that may be going on currently to improve the ecological integrity of the wildlife corridor.

Materials and Methods

The study area

The study was conducted in communities within the WWC in northern Ghana (Figure 1). The corridor passes through nine administrative districts in the Upper East, Upper West and North East Regions of Ghana. The human population within the nine districts is 627,180 and the majority of them are farmers. The catchment area of the WWC comprises of wildlife-protected areas, forest reserves and community resource management areas (CREMAs) (Box 1). The reserves and protected areas serve as critical wildlife habitats and provide essential ecosystem goods and services (Majam et al., 2017). The ecosystem services include pollinating agricultural crops, protecting water bodies and creating conducive microclimates for agriculture productivity. The heterogeneous collections of trees meet domestic requirements for firewood and charcoal, construction materials for houses, cattle kraals and fencing of gardens. Dominant tree species in the corridor at naturally vegetated areas include *Terminalia avicennioides, Combretum sp., Anogeissus leiocarpus*, *Vitellaria paradoxa, Daniellia oliveri, Grewia mollis, Gardenia sp., Piliostigma thonningii and Acacia sp.* Economic trees such as *Vitellaria paradoxa, Parkia biglobosa* and *Adansonia digitata* (baobab) are common in cultivated fields (Majam et al., 2017). The shorter shrubs and grasses provide fodder for livestock, which have resulted in high influx of alien Fulani herdsmen into the Corridor (Majam et al., 2017). Some of the most densely vegetated parts of the Corridor are along the channels of Kulpawn and Sissili rivers. However, this riverine vegetation that provides critical habitats for wildlife are under threat (Majam et al., 2017).

Some mammals found in the corridor include Waterbucks (*Kobus ellipsiprymnus defassa*), Bohor reedbuck (*Redunca redunca*), Bushbuck (*Tragelaphus scriptus*), African giant rat (*Cricetomys emini),* stripped Ground Squirrel (*Xerus erythropus*), Nile crocodile (*Crocodylus niloticus*), the monitor lizard (*Varanus sp.),* Oribi (*Ourebia ourebi*), Patas Monkey (*Erythrocebus patas*), Giant Rat (*Cricetomys gambianus*), Togo Hare (*Lepus microtis*), common Genet Cat (*Genetta genetta*), Civet Cat (*Civettictis civetta*), and Grasscutter (*Thryonomys swinderianus*) (Majam et al., 2017). Common bird species within the Corridor include Senegal Parrot (*Poicephalus senegalus*), Cattle Egret (*Bubulcus ibis*), African Green Pigeon (*Treron calvus*), African Grey Hornbill (*Tockus nasutus*), Senegal Coucal (*Centropus senegalensis*), Yellow-Fronted Canary (*Serinus mozambicus*), African Golden Oriole(*Oriolus auratus*), Spotted Fly Catcher (*Muscicapa striata*), Grey-Backed Camaroptera (*Camaroptera brevicaudata*), Yellow-Fronted Tinker Bird (*Pogoniulus chrysoconus* and Grasshopper Buzzard (*Butastur rufipennis)* (Majam et al., 2017).The CREMAs areas and reserves also have socio-economic and cultural functions for the communities (Pienaah et al., 2024).

The WWC falls within the West African semi-arid Guinea savannah belt, which has two main climatic seasons – the rainy season and dry season. The Sissili and Kulpawn Rivers with their many streams and tributaries drain WWC into the White Volta. The geology of the area is that of Middle Voltaic rocks. It consists mainly of Birimian, granite, igneous and metamorphic rock formations some of which are noted for deposits of gold and have consequently attracted illegal mining activities in communities such as Nangurima (Mamprugu Moagduri District), Bassisan and Pido (Sissala East Municipal), Duu, Joanfian and Danyokura (Wa East District) (Majam et al., 2017).

Box 1. **The Community Resource Management Areas (CREMAs) concept**
A CREMA is a geographically defined area that includes one or more communities that have agreed to manage natural resources in a sustainable manner. The CREMA serves as a community-based organization built on existing community decision-making structures including an executive body and a constitution that guides the activities and regulations of the CREMA. A District Assembly bylaw gives legal recognition and backing to the constitution. The community benefits as the CREMA provides a structure which enables collective decision-making for these shared resources while also enabling the community to make collective rules and establish a means by which to enforce these rules. The CREMA also provides a forum whereby external entities are able to access communities.
Source: (Majam et al., 2017)

Data collection methods

Qualitative data collection approaches were used to achieve the study objectives. These include desk study, key informant interviews and focused group discussions.

Desk study: desk study was used to review literature to gather and analyze existing research and publications related to elephant populations, distribution, and movement in Africa and Ghana in particular. We used the African Elephant Database (AED) and Google Scholar web search engine to access scholarly literature, including articles, books, thesis and other relevant sources of literature. Some key phrases used in searches include ‘‘Agriculture and land use’’, ‘‘wildlife habitats’’, ‘‘Agriculture and conservation’’, ‘‘wildlife corridors’’, ‘‘wildlife corridors in Ghana’’, ‘‘human-wildlife conflicts’’, ‘‘conservation in Ghana’’ and ‘‘the CREMA Concept’’

Key informant interviews: key informant interview method was used to gather in-depth information (Taylor & Blake, 2015) and insights from local farmers who possess deep knowledge on wildlife movements and human-wildlife conflicts in the study area. Eight persons, including, two experienced hunters, three local farmers and three

old women were identified in five different communities. All eight persons were older than 60 years. Only people over 50 years were selected because it is believed they might have had the opportunity of witnessing the effective co-existence between humans and wildlife or human-wildlife conflicts in the past. Two senior officials (Assistant Park Manager, MNP and Park Manager, Gbele Resource Reserve) at the Wildlife Division of the Forestry Commission were also interviewed as key informants. Three Forest Guards in charge of forest reserves in the WWC and four Range officers at the Mole National Park and Gbele Game Resource Reserve were interviewed as well.

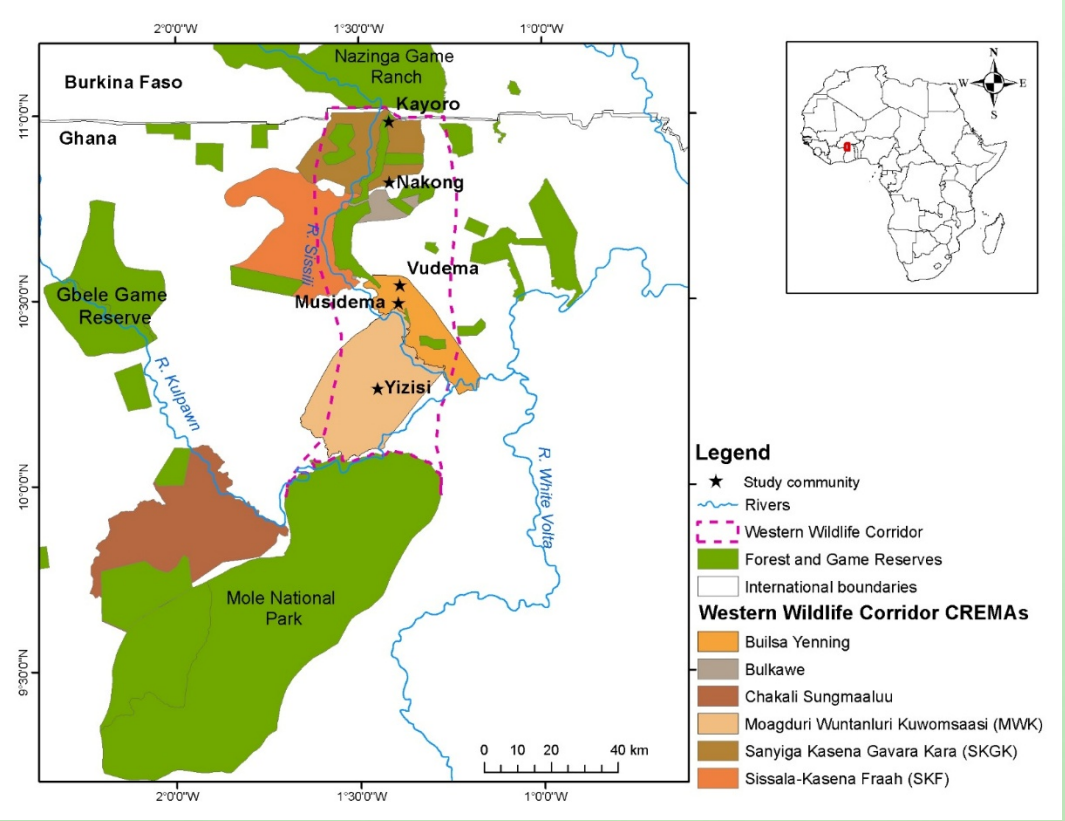

Figure 1. Map of the study area showing study communities

Table 1: Focused group discussion participants

Name of CREMA	Name of community	Number of participants		Community Coordinates	
		Females	Males	Lat. (N)	Long. (W)
Builsa Yenning (BY)	Vudema	5	7	10.541160	-1.388283
Builsa Yenning (BY)	Musidema	6	6	10.493533	-1.392635
Sanyiga Kasena Gavara Kara (SKGK)	Nakong	8	8	10.819513	-1.416515
Sanyiga Kasena Gavara Kara (SKGK)	Kayoro	8	12	10.983318	-1.416515
Chakali Sungmaaluu (CS)	Kulpong	9	11	9.859343	-2.249154
Moagduri Wuntanluri Kuwomsaasi (MWK)	Yizisi	12	9	10.262915	-1.451160

Focused group discussions (FGDs): The FGDs were conducted in six CREMA communities (Figure 1). These communities were purposively (Taylor & Blake, 2015) selected across the length of the WWC to cover its entirety. Participants in the groups comprised of local farmers who also double as community resource management committee (CRMC) members. We deliberately constituted groups with mixed age categories that include elderly people of 50 years or older. The age composition was a measure to ensure that some of the participants have lived long enough to have firsthand information on human-wildlife interaction in the past. Anecdotal statements indicated that wildlife presence in the WWC has been limited in recent years. Table 1 presents the communities and number of participants that took part in the focused group discussions.

Results and Discussion

Farmers' knowledge of the ecosystem services from the WWC and CREMAs

Communities within and around the WWC have demonstrated knowledge of the ecological and socio-economic importance of the WWC. Key informants and focus group discussants listed several ecosystem services including habitat for wildlife, food for human beings, water for all living organisms, fuelwood, wood for construction, cultural identity, indigenous knowledge systems, pollination of flowers, seeds dispersal, climate regulation and soil fertility support and improvement. These services can be categorized into the four main ecosystem services: provisioning, cultural, regulating and supporting services. Table 2 has details of responses from the focus group discussants.

Table 2. farmers' knowledge of ecosystem services

Benefits from WWC and CREMAs	Examples	Category of ecosystem service
Firewood, fruits, grass and rafters for roofing, medicine, fodder	❖ Our wives collect firewood from the CREMAs and the WWC. ❖ We collect edible fruits from shea (*Vitellaria paradoxa*), dawadawa (*Parkia biglobosa*), baobab (*Adansonia digitata*), *Gardenia erubescens* and *Diospyros mespiliformis*. ❖ We harvest thatching grass (*Cymbopogon giganteus*, *Pennisetum purpureum, Pennisetum pedicellatum* Trin) and cut poles (Anogeissus leiocarpus, Pterocarpus erinaceus) for constructing our housing structures.	provision service
The WWC and the CREMAs help to bring rain	❖ The presence of the vegetation in the WWC and the CREMAs provides us with purified water in our area. ❖ The trees in the CREMAs and WWC reduce wind speed to protect our crops from lodging. ❖ The air we breathe here is cleaner than the air at places where there are no trees. ❖ Some insects from trees make our crops produce fruits and seeds. ❖ The weather here is always cooler than the weather in the cities because of the trees we have	Regulating services
For cultural activities	❖ We learn a lot of traditional knowledge on the trees and grasses. ❖ When you walk through the forest your mind becomes relaxed. ❖ Some of the trees and animals represent our items of worship. ❖ We go on communal hunting in the forest.	Cultural services
Brings rain and fertile soil	❖ The plants make our soil fertile for cultivating our crops. ❖ The trees make the rain fall frequently in our area.	Supporting service

This knowledge of ecosystem services may have influenced the acceptance of CREMA establishment in most communities within and around the WWC. This finding is in line with the report of Lamarque et al. (2014) who indicated that farmers in the Central French Alps make environmental/conservation decisions mostly based on their knowledge of ecosystem services. The link between biodiversity loss and food insecurity is a key reminder of farmers about the importance of ecosystem services for effective agricultural productivity (Kpienbaareh et al., 2020). In this study, farmers have also recognized the intrinsic value of wildlife and consider the wild animals as a heritage that must be passed on from one generation to another. A female focus group discussant summarized this: '*The presence of the wild animals in our village lands is important for our community because our forebearers bequeathed them to us and we must also bequeath them to posterity'*. Intrinsic and heritage values of biodiversity

are significant determinants of positive attitudes towards conservation of nature across different classes of society (Abukari & Mwalyosi, 2018; Synman, 2014) and thus contribute to people's acceptance of conservation actions (Roszczynska-Kurasinska et al., 2021; Vucetich et al., 2015). Conservation incentives such as the provision of beehives for apiculture and the provision of cashew seedlings for the cultivation of perennial tree crops in some CREMA communities are very much recognized and appreciated in the studied communities. Success stories from the first beneficiary communities are being used to motivate new and prospective CREMA communities to establish their own CREMAs. However, the communities appealed to wildlife authorities and non-governmental conservation organizations to consider incentives that can benefit both humans and wildlife. For example, the construction of dugouts and dams for irrigation to enable dry season farming. This they indicated can boost their livelihoods through the cultivation of vegetables in the dry season and also serve as watering points for animals, including wildlife.

Farmers' acceptance and tolerance of wildlife albeit problems

In all visited communities, farmers through focused group discussions demonstrated high levels of wildlife tolerance, albeit the challenges they face including crop raiding, wildlife depredation and threat to human life. Figure 2 shows reported incidence of wildlife destruction in the previous five years. The incidence of wildlife destructions is common in communities adjacent to the two main protected areas linked by the WWC – the Mole National Park and the Nazinga Game Reserve. The most affected communities are Kayoro, the closest to the Nazinga Game Reserve and Kulpong, the closest to the Mole National Park. Though farmers are hesitant to retaliate the loss of their crops and livestock to wildlife, they strongly demand conservation authorities to pay them compensation for their loss. The non-payment or inadequacy of compensation for wildlife destruction is the main challenge identified by the communities as emphasized by a FGD participant *'we understand the animals to be animals, as such we can forgive their wrong doing, …but when our fellow human beings in charge of the animals refuse to help us when the animals destroy our crops or kill our livestock, it is frustrating and making it look like the sacrifices we make to protect the wild animals and their habitats are not appreciated'* (FGD; Kayoro; October 2024). None or delay payment of compensation for wildlife destruction is one of the key factors triggering aversion and negative attitudes towards wildlife conservation globally (Gross et al., 2025).

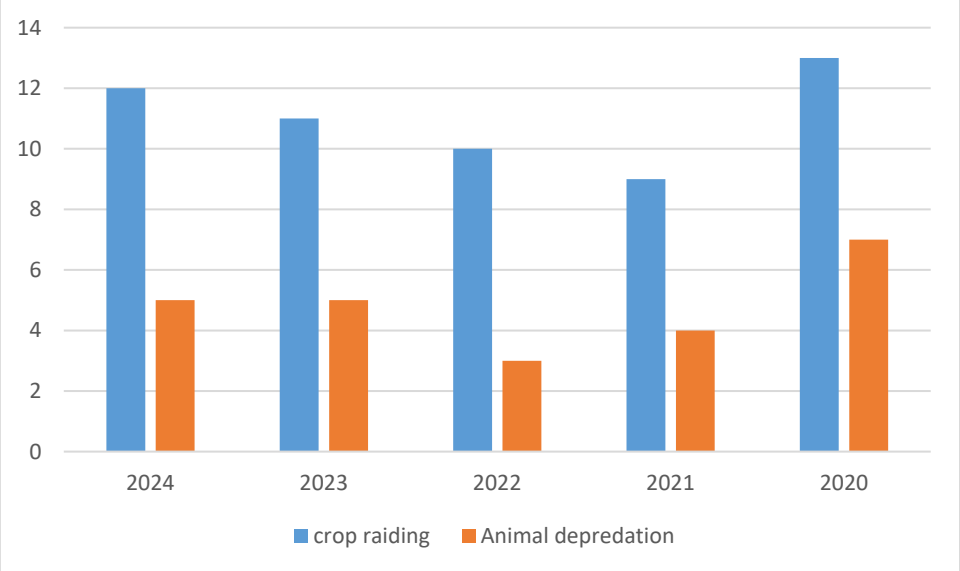

Figure 2. Reported wildlife destruction incidences From 2020 - 2024

Proulx (2024) notes that the cost of wildlife conservation should be borne by all beneficiaries of conservation benefits and not only communities adjacent to protected areas. Compensation for wildlife destruction is therefore one way to distribute the cost of conservation to lessen the burden of victims and present cost-sharing opportunities to other citizens. Crop raiding and livestock depredation are the two main wildlife destructions reported in the in the study area. Crop raiding cases are always more than depredation cases because there are always more herbivorous than carnivorous animals.

Though costly to victims, wildlife destruction does not escalate human-wildlife conflicts in the study area. All key informants and FGD discussants indicated that human-wildlife conflicts have never been a serious concern in the corridor. Though elephants (key crop raiding species) and other wild animals have always been destroying crops on farms, the people have always been tolerant of them and only find ways of driving them away from the farms. These tolerance and positive attitude towards elephants are attributed to the use of the elephant as a totem in many communities in the WWC. Human behavior towards wildlife is often judged on the bases of rational calculus of cost and benefits, ignoring the emotional and cultural aspects of the interaction (Suwannarong et al., 2024; Slagle

& Bruskotter, 2019) that influence behaviour. In this study, the cultural reasons are the key ones engendering positive attitudes and tolerance of wildlife in communities within the WWC. Key informants indicated that there has never been retaliatory killing of elephants for crop raiding. Poachers for the purpose of ivory extraction mostly carried out elephant killings that happened in the corridor. An old hunter however revealed that, even poaching for ivory is no longer lucrative because the current population of elephants in the area carry small tusks, which have low demand. However, it is instructive to note that hunting is a cultural heritage for some clans and individuals in the area. Such hunters will go hunting at all costs just to keep the cultural values alive. This category of hunters also targets the elephant to increase their fame and prestige. According to the traditional hunters' hierarchical arrangement, the highest ranked hunters are the ones that have ever killed an elephant. For this reason, traditional hunters always aspire to kill an elephant to get the highest rank. Farmers who also double as members of CREMA committees are always on the lookout for hunting activities in their vicinities. The CREMA committee members work collaboratively with wildlife authorities and non-governmental conservation organizations to expose wildlife crimes and other illegal activities in the WWC. When they observe illegal activities, CREMA members report to the wildlife authorities or conservation organizations to act.

Should the WWC be maintained?

We posed the question to find out if farmers were comfortable with the WWC's continuous existence because it may appear to be a competing land use activity for them. All participants in the focus group discussions agreed that the WWC should be maintained. They indicated that sustainability and rewilding of the WWC are hinged on the CREMAs in and around the corridor. A key informant at Nakong who was part of the establishment of one of the first CREMAs (SKGK) had this to say: '*at the beginning, we were informed that the main objective of creating the CREMAs in our communities is to help maintain the WWC, and so all the communities that accepted the CREMAs had in deed, agreed to protect the WWC'* (Interview #6; Kong; 2023). However, many key informants and focus group discussants expressed fear about the survival of the WWC and some CREMAs because of current developments. According to discussants and informants, the major threats to the survival of the WWC and CREMAs are expansion of commercial farmlands, expansion of build-up areas, grazing, logging, and mining for minerals such as gold. These activities are creating land hunger in the communities and destroying wildlife habitats. The communities have identified population growth and commercial farming as key underlying factors that drive encroachment into the WWC and some CREMAs. Globally, wildlife habitats are being threatened by the same human activities identified in this study (Padhiary & Kumar, 2024; Taylor-Brown et al., 2019; Scanes, 2018; Wantzen & Mol, 2013). However, the efforts of farmers in the current study to reverse wildlife habitat degradation is similar to those of their counterparts in Naibung'a in northern Kenya, where conservancies are managed through land zoning to improve security of wildlife and livelihoods in same space for farming, grazing and conservation activities (Mureithi et al., 2019). Such community-based initiatives seem to be effective for biodiversity conservation because all stakeholders are involved, and the motivation is based on multiple factors including economic and noneconomic.

Industry players and experts confirmed that the WWC is still relevant as it serves the purpose for which it was created. Forestry and wildlife officers indicated that the WWC is active, but a lot more must be done to provide alternative livelihood activities to communities in and around the corridor. Such livelihood activities must be conservation-compatible and more rewarding than existing livelihoods. Common livelihood activities in the corridor are farming, fuelwood extraction and charcoal production. These land-based livelihood activities put pressure on the resources within the WWC and reduce the quality of wildlife habitats. Farmers in the study area are active in participating in the integrated landscape management to sustain both farming and wildlife corridors and habitats.

Measures taken to safeguard the WWC include proper management of the forest reserves and the creation and maintenance of CREMAs in community lands in and around the corridor. To this end, a WWC management plan was designed mainly to help establish and maintain CREMAs in and around the WWC from 2017 to 2021. The goal was to get the CREMAs to become self-sustaining after their establishment. The Wildlife Division of the FC was largely the technical advisory agency for the implementation of the management plan. The goal of the management plan is largely achieved because six CREMAs are fully established and running. Eight more CREMAs have been inaugurated and are developing at various stages in and around the WWC under the auspices of the Upper West Regional office of the Forestry Commission. At the southern end of the corridor, the Mole National Park is also spearheading the establishment of five new CREMAs to secure a buffer zone around the park and enhance the integrity of the WWC.

Approaches to improve the agri-conservation landscape status of the WWC

Conservation interventions that aim to protect wildlife and their habitats in the corridor and enhance agriculture are often embedded in broader projects being implemented in northern Ghana. On-going projects at the time of this report included the Ghana Landscape Restoration and Small-Scale Mining Project (GLRSSMP) and the Ghana Shea Landscape Emission Reductions project (GSLERP). Under the GLRSSMP, the Forestry Commission (FC) through its Forest Services Division (FSD) undertook green firebreak establishment around forest reserves to prevent or minimize wildfires in the reserves and farms. Local farmers are key participants in this project where

they are taught to plant trees to create green fire belts to protect forest reserves and their farmlands from wildfire. Farmers in Ghana are already conscious about the dangers of wildfires and have over the years adopted indigenous wildfire management regimes for different agroecological zones (Appiah et al., 2010). The green firebelt initiative was therefore an improvement in their capacity to manage wildfire. The findings are also in line with Pinzón et al. (2025) who acknowledged the pivotal role farmers play in the prevention and control of wildfires in California. To ensure sustainability in the management of wildfires among farmers, the FSD also carried out wildfire prevention education, targeting the farmers in communities within the corridor. All these activities aimed at improving wildlife habitats and crop farms in forest reserves and off-reserve areas, respectively. Under the GSLERP, the FSD supported farmers to reforest degraded forest reserves through the modified taungya system (MTS). Taungya is an agroforestry system that combines a stand of woody species and agricultural crops during the early years of plantation development to improve food production and reforestation of degraded areas (Acheampong et al., 2016). The MTS is an improvement of the taungya system to ensure that farmers and other local stakeholders benefit from the proceeds made from harvested timber trees by the state institution in charge of forest resources – the FC (Acheampong et al., 2016). The Wildlife Division (WD) of the FC also received support from the GLRSSMP to strengthen existing CREMAs and create new ones. Through this support, eleven new CREMAs were being established in addition to the existing eight CREMAs at the time this report was made. It is widely recognized that community-based natural resources management approaches like the CREMA in Ghana are designed to empower local communities and make them conscious of their ownership rights of the resources in their vicinity (Heffernan, 2022; Fabricius, 2013; Gruber, 2010; Fabricius & Collins, 2007)

Conservation efforts in maintaining the WWC have largely been successful in both forest reserves and off-reserve areas due to the buy-in of local farmers. According to FSD officials, the forest reserves are in good shape and more farming communities continue to accept the CREMA concept and create CREMAs in their lands. However, a major challenge is the expansion of commercial farmlands in and around the corridor. Grazing, charcoal production and logging are other important activities threatening the ecological integrity of the WWC.

Conclusion

The study has examined the participation of local farmers in an integrated landscape management approach to enhance agriculture and wildlife conservation in same spaces. The results suggest that with the right approach and strategies, seemingly conflicting land use activities such as crop farming and conservation can be married effectively. Underlying cultural values and knowledge of ecosystem services are significant factors that can engender positive attitudes and exude behaviours from farmers that favour conservation. It will therefore be useful to precede community-based conservation interventions with some community education and awarenesss campaigns on all the ecosystem services. This may draw the target audience's attention to the noneconomic services such as supporting, cultural and regulating services, and may secure their buy-in into proposed interventions. Collaboration between various stakeholders in different institutions at the national and local levels is essential to secure genuine participation of local communities. The effective collaboration between the various divisions of the Forestry Commission and the local farmers ensures the successful creation and management of CREMAs in many communities. The local farmers who also double as CREMA executives agreed to participate in protecting the WWC due to the trust established between them and the wildlife authorities. However, it is important to note that financing of various direct and indirect conservation projects in the WWC must be continued since this supports the creation and maintenance of the CREMAs established at different places. It will also be useful to consider the prompt payment of compensation to farmers when they fall victim to wildlife depredation and crop raiding. This will strengthen the support of farmers for the conservation of the WWC and CREMAs. Further studies are needed in the WWC to establish land tenure systems and land transactions to understand how commercial farmers and other investors are able to get large parcels of land for their business activities.

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