



How does climate exacerbate root causes of conflict in Mali?

An impact pathway analysis

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This factsheet gives answers on how climate exacerbates root causes of conflict in Mali, using an impact pathway analysis. Two main impact pathways are identified:

1. Livelihood and Food Security: Climate variability and extreme weather events undermine the viability of climate-sensitive livelihoods dependent on natural resources such as livestock, agriculture, and fishery. While seasonal migration has been a frequent adaptation strategy, migration patterns are becoming more permanent, leading to increased competition in host communities. At the same time, livelihood insecurity has been a driver for recruitment into non-state armed groups, exacerbating conflict dynamics;

2. Resource Availability and Access: Climate change and variability impact resource availability and environmental conditions, contributing to an increase in the competition over the access and use of natural resources, reducing levels of social cohesion, and increasing conflicts between and among different livelihood groups. Disputes for access and use of limited resource availability concerns mostly land and water sources, crucial for Mali's agricultural sector.

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1 How does climate exacerbate root causes of conflict?

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3 What is the underlying structure of the climate, conflict, and socio-economic system?

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4 Are climate and security policies coherent and integrated?

Policy coherence analysis

5 Are policy makers aware of the climate security nexus?

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* Questions 1, 2, 3, 5 are analyzed at country level through a Climate Risk Lens (impact pathways, economic, spatial, network and social media analyses). The policy coherence and scopus analyses are at continental level.

**Scopus is one of the largest curated abstract and citation databases, with a wide global and regional coverage of scientific journals, conference proceedings, and books. We used Scopus data for analyzing: (1) how global climate research addresses the dynamics between climate, socio-economic factors, and conflict, and (2) how the countries studied are represented in the database.

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PATHWAY#1: **Livelihood and Food Security**

Climate variability and extreme weather events undermine the viability of climate-sensitive livelihoods dependent on natural resources such as livestock, agriculture, and fishery. While seasonal migration has been a frequent adaptation strategy, migration patterns are becoming more permanent, leading to increased competition in host communities. At the same time, livelihood insecurity has been a driver for recruitment into non-state armed groups, exacerbating conflict dynamics.

PATHWAY#2: **Resource Availability and Access**

Climate change and variability impact resource availability and environmental conditions, contributing to an increase in the competition over the access and use of natural resources, reducing levels of social cohesion, and increasing conflicts between and among different livelihood groups. Disputes for access and use of limited resource availability concerns mostly land and water sources, crucial for Mali's agricultural sector.

1. CONTEXT

Climate Profile

Mali is divided into three climatic zones: an arid north covering two thirds of the country, including part of the Sahara Desert, with dry seasons of up to nine months; a semi-arid Sahelian centre with a relatively dry climate extending from steppe to savanna vegetation in its south; and a Sudanian southern zone with savanna and forest vegetation (UNFCCC, 2018; USAID, 2018). The Senegal and Niger rivers cross the country, the latter forming the inner Niger Delta with its various arms, interrupting Mali's semi-arid central zone (UNFCCC, 2018). The climate is typically characterized by a dry season between March and June, a wet season between June and September, and a cold season between October and February, punctuated with drying Harmattan dust storms (UNFCCC, 2018).

Mali is part of the Sahel, one of the most climate-vulnerable regions of the world (Busby et al., 2014). Since the 1960s, there has been an overall increase in annual temperatures of 0.7°C (USAID, 2019). While there was a rapid decline in rainfall between 1950 and 1980, followed by a partial recovery in the 1990s, a below-average precipitation level was recorded for 2000 to 2009, down 12 percent compared to the baseline period from 1920 to 1969 (Birkel & Mayewski, 2015; USAID, 2019). Climatic projections expect an increase in temperatures of between 1.4°C to 2.0°C by 2050, becoming gradually more pronounced from south to north, while annual precipitation is expected to decline between 2.5 and 12.5 percent from south to north by mid-century (UNFCCC, 2018). With increased rainfall variability, Mali will likely experience an increased incidence of drought and floods (UNFCCC, 2018; USAID, 2018; Nagarajan, 2020). Overall, accelerated desertification and an increase in the frequency of Harmattan dust storms are expected in the north, and an increasing incidence of heavy rainfall and flooding in the south (USAID, 2019).

Conflict and Fragility

Mali has experienced large-scale and widespread conflict, with repeated cycles of violence involving state-based, intrastate, and communal violence (UCDP, 2022). French colonial rule and different post-colonial governments have contributed to exacerbating historical tensions between the ethnically diverse north and south, amplifying regional disparities and grievances, particularly those felt by the Tuareg in northern Mali (Chauzal and van Damme, 2015; Ba and Bøås, 2017; Hegazi et al., 2021). These grievances resulted in several Tuareg-led insurrections in 1963, 1991, 2006, and most recently in 2012 (Chauzal and van Damme, 2015; Ba and Bøås, 2017).

The 2012 insurrection metamorphosed into a volatile multidimensional security crisis, one that saw the proliferation of armed actors, including ethnic-based self-defence groups, jihadist movements, and transnational and local criminal networks (Ba and Bøås, 2017). Additionally, the recent escalation with two coups d'état in 2020 and 2021 led to revived political tensions while the northern and central parts of the country remain occupied by armed groups amidst continuing violence and instability (Benjaminsen & Ba, 2021; ICG, 2021). The complex root causes of conflict and insurgencies in Mali include perceived and actual socio-economic exclusion and structural marginalization, limited or corrupt state presence in peripheral areas, exploitation of and control over natural resources, and friction between ethnic groups (Hegazi et al., 2021; Basel et al., 2021). Moreover, even though the

1991 revolution established a multi-party system, corruption, weak governance, and centralized rule continue to beset state institutions (IMRAP and Interpeace, 2015).

Socio-Economic Profile

Mali's economy is heavily reliant on natural resources. The agricultural, livestock, and fishery sectors are the backbone of Mali's economy, engaging 65.3 percent of the workforce, contributing 40.2 percent to GDP (ADB, 2021) and accounting for 75 percent of Mali's exports (UNFCCC, 2018). However, these sectors are highly vulnerable to climate variability and extreme weather events, partly due to the sector's high dependence on rainfed agriculture (95 percent) and reliance on subsistence smallholder farming (UNFCCC, 2018, USAID, 2019). Under-developed markets and a lack of adequate infrastructure, financing, fertilizers, and equipment, together with persistent insecurity curtail agricultural productivity and therefore Mali's ability to meet the food requirements of the country's growing population (Ba and Bøås, 2017; CIAT et al., 2020). Gold is Mali's largest export product, characterized by extraction dominated by artisanal sites and individual gold panners in Mali's south (UNFCCC, 2018; Marquette, 2020). Although artisanal gold mining provides a livelihood for an estimated 700 000 people in southern Mali (ICG, 2019), these activities often remain unregulated and untaxed, contribute to environmental degradation, and are sometimes linked with armed groups and criminal networks, entrenching socio-economic grievances and becoming a source of conflict and fragility (Sollazzo, 2018; ICG, 2019; Marquette, 2020).

Armed conflict has critically affected the Malian economy and society, exacerbating historic socio-economic and political vulnerabilities (Ba and Bøås, 2017). Despite some progress, poverty is widespread across Mali with 46.8 percent of people living in poverty, with significant regional differences that illustrate a marked rural-urban inequality. While just 7.4 percent live in poverty in the capital Bamako, in rural areas this rises to 55.2 percent due to a general lack of economic opportunities, spurring migration towards urban centres (INSTAT, 2017). Official figures put the level of unemployment at 4 percent, while around 10 percent face underemployment. Unemployment is especially widespread among youth in urban settings such as Bamako (INSTAT, 2020). Food insecurity rates indicate that 19 percent of households were food insecure in 2018, of which 2.6 percent faced acute food insecurity (ADB, 2021). In 2022, acute food insecurity rose to 8.7 percent in the context of exceptionally high food prices and low output of the 2021/2022 agricultural season (FAO, 2022). The total population of Mali has increased from 5.3 million in 1960 to 20.3 million in 2020 and it is projected to reach 44 million by 2050. Mali currently has one of the highest annual population growth rates in the world, at 3.6 percent (UNFPA 2020; UNFCCC, 2018). This will likely place additional stress on natural resources and further contribute to environmental degradation (Nagarajan 2020). Per capita water availability is projected to suffer a 77 percent decline by 2080 (Tomalka et al., 2020).

2. CLIMATE SECURITY PATHWAYS

Rising temperatures, and high rainfall variability are reducing yields of rainfed crops and leading to declining livestock productivity and production due to heat stress and reduced water availability, a decrease in the range and access to pasture through desertification and drought, and an increase in the incidence of pests and diseases (Ministère de l'Environnement, 2018; USAID, 2019). Recurrent

drought in Mali, as in the wider Sahel region, has contributed to severe food crises due to reduced crop yields and loss of livestock, most markedly in the periods 1972 to 1974, 1983 to 1985, 2002 to 2003, 2011 to 2012, and 2015 to 2018. The drought in the early 1970s led to a loss of 40 percent of livestock while the drought in the early 2010s resulted in 3.5 million Malians facing food insecurity (WBG & GFDRR, 2019). Increased climate variability further impacts land, water, food systems in a country highly dependent on climate-sensitive sectors such as pastoralism, fishery, and subsistence agriculture with implications for livelihoods and availability of natural resources. The impact can be categorized in two main pathways:

- Livelihood and food insecurity (**Pathway #1**).
- Resource availability and access (**Pathway #2**).

PATHWAY #1 Livelihood and Food Security

Overview

Climate variability and extreme weather events undermine the viability of climate-sensitive livelihoods dependent on natural resources such as livestock, agriculture, and fishery (Generoso, 2015; UNFCCC, 2020; CIAT et al., 2020). While seasonal migration has been a frequent adaptation strategy, migration patterns are becoming more permanent, leading to increased competition in host communities (Nagarajan 2020; Ursu 2018; Hegazi et al., 2021). At the same time, livelihood insecurity has been a driver for recruitment into non-state armed groups, exacerbating conflict dynamics (Théroux-Bénoni et al., 2016; Hegazi et al., 2021; Brown et al., 2022).

The effects of climate variability on food and livelihood security are prominently channelled through its impact on agriculture and food production (Tomalka et al., 2020; Basel et al., 2021; CIAT et al., 2020; Pacillo et al., 2022). This is particularly worrisome considering that 95 percent of Malian agriculture – mostly subsistence farming – is rainfed, making it extremely climate-sensitive (USAID 2018; CIAT et al., 2020). Rising temperatures and rainfall variability are likely to result in reduced yields of rainfed crops in the foreseeable future (Generoso, 2015; USAID 2018; USAID 2019). Crop production is projected to see a decline in productivity, affecting livelihoods and national and household food security. (USAID 2019; MoFA of the Netherlands 2018; CIAT et al., 2020). The yield of key staple crops like millet, maize and sorghum, which provide around 35 percent of daily calorification intake, are expected to decline by 4.3 percent, 16.3 percent and 3.5 percent respectively by 2050. The yield of cotton, a crucial cash crop that contributes 3.1 percent of Mali's GDP and supports thousands of livelihoods, is projected to decrease 4.2 percent by 2050 (CIAT et al., 2020). Climate-related barriers interacting with land and financial barriers, including limited access to sources of formal credit due to widespread poverty, further hamper agricultural output. For sedentary farmers, this is compounded by high input prices, inadequate land access and ownership rights, and time and labour constraints in collective versus individual plots (CIAT et al., 2020; Sanga et al., 2021).

The future effects of climate change and variability are likely to further strain the livestock industry, another key Malian economic sector that employs 21 percent of the population (Pflaum, 2021), contributes 30 percent of Mali's agricultural GDP and is key for most people since 80 percent of agricultural households own livestock (UNFCCC, 2018; CIAT et al., 2020). Climbing temperatures

and a decline in average precipitation are projected to reduce livestock animal weight between 14 percent and 16 percent and decrease forage yields between 5 percent and 36 percent (MoFA of the Netherlands 2018). At the same time, desertification and drought may decrease the range and access to pasture, and affect grazing potential and fodder production (USAID, 2019). Rising temperatures are also predicted to affect livestock by increasing mortality due to heat stress and the prevalence of diseases (Nagarajan 2020; USAID 2018).

Climate variability, which leads to reduced depth, shrinking and silting of water bodies, declines fish stocks, affecting the livelihoods of fisherfolk. Additionally, the length of the fishing season has halved from eight months to three months, further affecting fishery production (Nagarajan et al., 2022). This has a severe impact on Mali's economy as fishery is one of the pillars of the national economy, representing 4.2 percent of Mali's total GDP and producing up to 100 000 tonnes of fish a year (UNFCCC, 2020). Declining fish stocks will increase livelihood insecurity and poverty as 330 000 Malians (4.5 percent of the active population) are engaged in the fishery value chain, especially in the Inner Niger Delta, Gao and Sikasso (EC, 2021)

With increasing climate stress, overall food availability decreases. Large and medium-sized farms might be able to mitigate household food insecurity but small farms face particular vulnerability (Traore et al., 2017; Segnon et al., 2021). Women-headed households especially are disproportionately affected due to lack of assets, alternative resource income, and access to services, further undermining their resilience to climate-induced livelihood impacts (McOmer, 2020; Gorman & Chauzal, 2019). At the same time, decreased agricultural production affects all Malian households. Food price inflation due to reduced food supply impacts purchasing power, especially that of low-income households (WBG, 2022; FEWS NET, 2022). For instance, prices for food and non-alcoholic beverages rose by 5.2 percent in 2021 against an increase of 2.5 percent in 2020 (WBG, 2022). Other factors contributing to higher food prices are persistent insecurity, economic sanctions by ECOWAS and disruption of international supply chains due to the war in Ukraine (WBG, 2022; FEWS NET, 2022).

Climate change has an impact on land, water, and food systems, affecting disproportionately climate-sensitive livelihood groups such as farmers, herders, and fishermen (Nagarajan, 2020), exacerbated by conflict and demographic pressure. In periods of increased stress, when agrarian yields or other resources are low, rural households in Mali tend to rely on non-timber forest products as an alternative to ensure food security and supplementary income (Robledo et al., 2012). However, some state agencies have engaged in extortion and rent-seeking behaviour in the name of environmental protection of forests. In the 1980s, the Malian forest service was established amidst an international desertification discourse to protect the country's forests (Benjaminsen, 2000; Nagarajan, 2020). Its armed agents have been heavy-handed and predatory in taxing, imprisoning and fining women collecting firewood and pastoralists grazing livestock in forest areas (Benjaminsen, 2000; Benjaminsen & Ba, 2018; Nagarjan, 2020). At the same time, the consequences of climate change, such as drought, heat waves, desertification, and irregular rainfall, also negatively impact forests. (UNFCCC, 2018). The loss of forests is exacerbated by the conversion of forest areas into agricultural land and to meet an increasing demand of urban centers for charcoal and firewood (CIAT et al., 2020; Brown et al., 2022). The forest industry contributes 13 percent of Mali's GDP and covered 26 percent of the country in 2014. Between 2000 and 2020, Mali lost 3.3 percent of its tree cover (Global Forest Watch, 2022), further restricting forest products as a livelihood alternative for many households.

Seasonal and circular migration are strategies that help communities build resilience and cope with the changing effects of climate (Hummel, 2016; Mitra 2017; Nagarajan 2020). During seasonal floods and droughts, one-third of the workforce seasonally migrates in search of jobs from rural areas towards urban centers in the south (UNEP, 2011; Hegazi et al., 2021). For example, fishing communities move in search of better catches, markets and work opportunities, while farmers and herders migrate in search of temporary employment to supplement incomes. Girls and women often supplement family income by migrating to urban centers (Nimaga, 2012; Nagarajan et al., 2022). The rural-urban migration dynamic is further fueled by forced displacement due to natural disasters and conflict. Between 2016 and 2021, 54,293 people were newly displaced internally by disasters such as floods, storms, extreme temperatures and drought (IDMC, 2022). However, temporary migration is turning increasingly into permanent migration due to climate-induced livelihood insecurity, exacerbated by violence in rural areas (Nagarajan, 2020). Permanent migration, along with existing high population growth and other socio-economic factors may, over time, increase competition for resources in urban areas and create tension between migrants and host communities (Marquette 2020; Nagarajan 2020; Ursu 2018; Hegazi et al., 2021). Often viewed as inferior by host communities, conflicts involving migrants mostly centre on land ownership, inheritance rights, and the length and conditions imposed under land lease agreements (Marquette, 2020).

Socio-economic grievances are drivers of conflict and violence in Mali. Climate change and variability, further deepening socio-economic vulnerabilities is likely to exacerbate these grievances (Ba and Bøås, 2017; Basel et al., 2021; Nagarjan, 2020 (NUPI & SIPRI, 2021). Poverty, unemployment, and overall socio-economic vulnerability are considered crucial drivers for the recruitment into non-state armed groups (NSAGs) in Mali (Thérout-Bénoni et al., 2016; Hegazi et al., 2021; Brown et al., 2022). Climate change contributes to this dynamic by increasing socio-economic vulnerabilities and local grievances, which in turn, raise prospects for recruitment by NSAGs (Nett & Rüttinger, 2016; Hegazi et al., 2021). For example, reports suggest that recruitment of children was significantly higher during periods of rain scarcity, with families dependent on agrarian livelihoods sending their children to armed groups to generate additional income (Hegazi et al., 2021). Conflict- and climate-induced migration and especially forced displacement often leaves people in a precarious and vulnerable situation, rendering them more susceptible to exploitation by NSAGs (Hegazi et al., 2021). Along with recruitment dynamics, NSAGs have also offered economic incentives and food to rural communities in exchange for loyalty (Hegazi et al., 2021).

At the same time, violent conflict has further undermined livelihood security, social cohesion and governance, providing another entry point for NSAGs. For instance, when NSAGs look to address justice and socio-economic vulnerabilities, they may see their legitimacy increase and find more informants and supporters (Nagarajan 2020; Ursu 2018). NSAGs have built wells, small-scale dams, and other projects to improve the resilience of communities to climate variability (Hegazi et al., 2021), likely strengthening support among the local population.

Livelihood and Food Security in the South: Sikasso Region

Sikasso is a common reception area for seasonal and increasingly permanent migrants from climate-sensitive rural areas of the country, such as the inner Niger Delta in central Mali. The influx of migrants may exacerbate existing land conflicts in the area. Sikasso is a city and region in Mali's southern

breadbasket. With 80 percent of the population engaged in agriculture, it produces 29.4 percent of the national total production of traditional cereals such as maize, sorghum, rice, millet, and *fonio* (a local gluten-free grain), and it is a major fruit and vegetable production area. (Marquette, 2020). Despite higher land fertility and more favourable rainfall compared to the rest of the country, Sikasso is among the regions in the country with the highest poverty rates (65.8 percent) (UNFCCC, 2020) and suffers widespread food insecurity (Cooper & West, 2017; Allison, 2017), affecting 15 percent of the population (IFRC, 2022). This “agricultural paradox” is partly driven by agricultural policies related to a predominant focus on cotton production rather than food crops, market reforms in the area, as well as climate risks such as rising temperatures, greater rainfall variability and an increase in extreme weather events, all of which have contributed to lower yields (Staatz et al., 2011; Cooper & West, 2017; Pacillo et al., 2022). The production of maize in the region, providing 10.8 percent of the total caloric intake in Mali (CIAT et al., 2020), is projected to decrease around 10 percent by 2060 (Ebi et al., 2011).

While Sikasso is relatively stable compared to central and northern parts of the country, conflicts over land occasionally flare up, varying in intensity and scale. Although conflicts over land use tend to occur between different socio-economic and ethnic groups, increasing conflicts over land access indicate that population growth and the influx of migrants are putting pressure on land availability (Marquette 2020; Nagarajan et al., 2020). Sikasso is traditionally an area of internal and external migration and host to international, regional and intraregional migrants. For example, the Minianka community moved permanently from the north of the region to the south following the droughts of the 1970s and 1980s (Marquette, 2020). However, climate change and its effects on livelihoods in the central and northern parts of Mali are driving an increasing influx of permanent migrants, compounded by instability that further undermines climate resilience and likely exacerbates migration patterns southwards (Hegazi et al., 2021; Nagarjan, 2020; Ursu, 2018).

Local leadership institutions and customs that place control of familial land in the hands of male elders often work against the structurally excluded migrant populations. Migrants, whose status does not change regardless of time spent in the area, can only borrow land, not own it, and as a consequence they are vulnerable to expropriation. This inferior status can lead to entrenched grievances. Furthermore, migrant communities seen as prosperous can attract resentment and suffer attempts to limit their access to land (Marquette, 2020; Nagarajan, 2020). As a result, the conflicts over land ownership that are most likely to escalate include those between host communities and migrants over inheritance, and the length and conditions of land lease agreements (Marquette, 2020).

Livelihood and Food Security in Central Mali: Gao, Mopti, and Segou

In Mali, climate-related livelihood insecurity creates opportunities for NSAGs by providing entry points for mustering support from the local population. The dynamic plays out in conflict-affected northern and central Mali, where drought- and desertification-induced water and food scarcity have led to fewer opportunities for traditional means of livelihood, fostering recruitment opportunities for armed groups such as Dan Na Ambassagou, Jama'at Nusrat al-Islam wal-Muslimin (JNIM) and Tuareg Rebels (Seiyefa, 2019).

In recent years, northern and central Mali have seen an overlay of desertification and drought along with an expansion of armed groups (USAID, 2019). Linked to the prevalence of climate sensitive

livelihoods of these arid and semi-arid areas, food insecurity is especially prevalent in regions of central Mali bordering Niger and Burkina Faso (Food Security Cluster, 2022), with 44 percent, 47 percent and 22 percent of the population facing food insecurity in Gao, Mopti, and Segou respectively (Cadre Harmonisé, 2021)¹. The reasons for recruitment into the NSAGs are complex and linked to multiple factors. Government inaction and grievances against the state, community leaders, and elites, and the social prestige linked to taking up arms are all factors that play into recruitment dynamics (Brottem & McDonnell, 2020; Hegazi et al., 2021). In Mopti, many have pledged alliance to armed groups in order to protect their income-generating activities such as livestock farming. For example, cattle farmers have joined armed groups to defend themselves against cattle rustling (Théroux-Bénoni et al., 2016). Fatigued by corruption and neglect by state authorities, pastoralists have been found to support jihadist groups also because of an anti-state, anti-elite and pro-pastoral jihadist discourse (Benjaminsen & Ba, 2009; Muggah & Luengo-Cabrera, 2019). For example, the speeches of Katiba Macina's leader contain messages of equality and justice, aimed to attract subordinate classes such as the Rimaibé (low-caste Fulani) and the Bella (low-caste Tuareg) against the power of the *jowros*, traditional pastoral leaders (Benjaminsen & Ba, 2009). In 2016, the group prevented *jowros* from collecting fees from herders returning from dryland pastures to enter the wetland pastures in the delta. As a result, given the unpopularity of these fees, the NSAGs played on anti-elite feelings to gain more sympathizers among herders (Benjaminsen & Ba, 2009).

As a result, water scarcity has indirectly contributed to the recruitment of herders into non-state armed actors due to the increasingly challenging circumstances and lack of alternative livelihood strategies (Hegazi et al., 2021). While some herders joined jihadist groups because of a belief in their messages, others are motivated by financial incentives, with payments being made of around 150 000 FCFA (approximately USD 235) (Benjaminsen & Ba, 2009). However, the main drivers for recruitment into armed groups are economic in nature, including poverty and difficulties in meeting basic needs, as well as lack of perspectives and marginalization (Théroux-Bénoni et al., 2016; Ursu, 2019). Armed groups, such as Al-Qaeda in the Islamic Maghreb (AQIM) and, more recently, JNIM have taken advantage of the local population's financial-related vulnerabilities and have provided employment for the youth. Another group, Katiba Macina (Le Front de Libération du Macina) from central Mali around Mopti, provided communities with food to ensure their collaboration and loyalty (Hegazi et al., 2021). A recent survey revealed that 15 percent of respondents in Mopti identify joining criminal or extremist group as a mitigation strategy (Brown et al., 2022).

PATHWAY #2 Resource Availability and Access

Overview

Climate change and variability impact resource availability and environmental conditions, contributing to an increase in competition over the access and use of scarce natural resources, reducing levels of social cohesion, and increasing conflict between and among different livelihood groups (Ba and Bøås, 2017; Nagarajan 2020; Raineri 2018; MoFA of the Netherlands 2018; Tarif and Grand 2021; Ursu 2018). Disputes for access and use of limited resources concern mostly land and water sources, crucial for Mali's agricultural sector.

¹ Calculated from table of page 3, estimated numbers of total population and food insecurity. Food insecurity defined as the percentage of population in phase 2 to 5.

Climate variability impacts resource-related livelihoods based on fisheries, pastoralism and sedentary farming. In an effort to cope with the increasingly more severe dry season and decreasing pasture and water availability, pastoralist communities change grazing routes in search of alternatives (Nagarajan 2020; MoFA of the Netherlands 2018). A number of factors further contribute to these changes, for example, conflict patterns, urbanization, government policies favouring agricultural over pastoralist livelihoods and unsustainable expansion of agriculture to counter the loss in yields, all occur frequently at the expense of traditional grazing routes (Ibrahim and Zapata 2018; Nagarajan, 2020). Soil loss due to erosion and continued cultivation is estimated to be between 1 and 10 t/ha per year (CIAT et al., 2021). Overall, increased climate variability has led to irregular seasons and uncertain timings, resulting in unclear transitions of when farmers harvest their crops and pastoralists can subsequently come in with livestock for grazing or accessing water (Nagarajan, 2020). The uncertain timing leads to the encroachment of cattle onto farmland before harvest, damaging crops, and leading to disputes between farmer and herders, especially in areas that lack well demarcated livestock corridors and pastureland with access to water resources (Nagarajan, 2020). Conflicts between farmers and pastoralists are not new; however, the importance of competition over land as a driver of conflict is rising (Ba and Bøås, 2017; Nagarajan 2020; Pflaum, 2021). In a regional comparison, Mali has the largest share of pastoralist actors linked to violent events (21 percent) and one of the highest percentages of pastoralist violent events relative to total violent events (60 percent) (Pflaum, 2021). The cycles of farmer-herder violence have become increasingly lethal since 2015. In 2020, nearly 700 fatalities were recorded (Brottem, 2021).

Disputes over the access and use of natural resources also take place among the same livelihood groups, often overlapping with cleavages between ethnic groups and the articulation of narratives that draw from historical grievances (Nagarajan, 2020). Commonly, Fulani and Tuareg are associated with pastoralism, Dogon and Bambare are farmers, and Bozo and Somono are engaged in fishing and river transportation. For instance, there are considerable tensions between Tuareg and Fulani pastoralist communities over the control of pasture and water resources for their livestock due to degraded fields and lack of grazing lands (Nagarajan 2020). Furthermore, frequent interaction between different livelihood groups in the exchange of goods had previously helped smoothen matters in case of tensions. However, due to decreased availability of resources, many families started to mix livelihood strategies and these exchanges became obsolete. Therefore, not only are positive interactions reduced, but also competition is increased (Nagarajan, 2020).

Local resource disputes increasingly connect with national and regional conflict dynamics, and community violence increasingly sees the involvement of state forces and armed groups, making their resolution more difficult (Mbaye, 2020; Benjaminsen & Ba, 2021). At the same time, NSAGs have capitalized on the absence of government forces in northern and central Mali, providing protection and support to farmers and herders. For instance, NSAGs have defined rules for livestock migration and also established conflict resolution mechanisms to resolve disputes around natural resources, which, in turn, has increased their support among local population (Ravnskilde 2021; Walch, 2018; Ba & Benjaminsen, 2021).

Gold mining activities are also a source of resource-related conflict in Mali. First, gold extraction additionally decreases access to land and severely impacts the quality of water, further fueling conflict

dynamics over resource availability and access. At the same time, the gold sector drives its own set of resource-based grievances among the local communities, largely due to land-grabbing practices and the lack of benefits from extraction activities (Sollazzo, 2018; Marquette, 2020). The informality of the gold sector entails that these activities often remain untaxed, therefore not benefitting local development, and occur against a backdrop of increasing insecurity, illicit financial flows, human rights abuses, and corruption (Sollazzo, 2018; The International Institute for Sustainable Development, 2022; OECD, 2022). In some cases, NSAGs get involved in artisanal gold mining, seeing it as an additional source of funding and potential recruits, further fueling conflict dynamics (Sollazzo, 2018; ICG, 2019).

Resource Availability and Access in the Inner Niger Delta (Mopti)

While the livelihood of most people in Mali depends on agriculture and pastoralism, it is especially true in the Mopti region of the inner Niger Delta where herders, farmers, and fisherfolk have coexisted amidst abundant natural resources. However, conflict over access to these resources has increased in recent years (Pflaum, 2021). At the same time, these communal conflicts offered armed groups fertile ground for mobilizing along ethnic or other fault lines (Ursu, 2018). Since 2013, the hotspot of resource-related clashes between livelihood groups has been situated in Mopti, close to the border with Burkina Faso (Brottem, 2020; Pflaum, 2021).

At the southern edge of the Sahara, the inner Niger Delta has been and remains a contested space in which various groups coexist and exploit natural resources, using the unique and fragile ecosystem in different ways at different times of the year (Ursu 2018; Brown et al., 2022). The activities of pastoralists, fishermen, and farmers follow natural cycles: rhythms of seasonal rains, the tide of the Niger River, and the rotation of herd movements. Once the rainy season begins and the delta is flooded, pastoralists move their herds to the south and east of Mopti, while farmers cultivate the flooded zones. At the same time, fisherfolk utilize the channels flooded by the river. Once the water recedes, fertile lands for agriculture and pastoralism emerge, and pastoralists lead herds of cattle onto fresh grazing land (Ursu, 2018). The importance of the delta's ecosystem is underlined by its 15 percent contribution to the country's cereal production, 80 percent of the national fish trade, and feeding 60 percent of livestock in the dry season (CIAT et al., 2021; Brown et al., 2022).

The inner Niger Delta, one of the largest wetlands in the world, faces soil erosion, desertification, recurrent drought, salinization and desiccation, exacerbated by the impact of climate change, such as increasingly erratic water availability in and across seasons, both in volume and predictability (Brown et al., 2022) and rising temperatures, leading, for instance, to increased evapotranspiration (USAID, 2018; UNFCCC, 2020; Thompson et al., 2021). In the short-term, water availability is also impacted by infrastructure projects such as dams and large-scale irrigation projects upstream (Brown et al., 2022). The result is a reduction of available flood areas and productivity, and overexploitation and degradation of resources, which disrupts previous usage patterns in an already fragile socio-economic system. For example, as consequence of the altered resource base, an increase in cultivated land along the river Niger and its tributaries decreases available grazing land and access to water sources for pastoralists (Ursu, 2018, Brown et al., 2022). At the same time, conflict reduces the flexibility for livestock movement to other regions. Since the outbreak of conflict in northern Mali in 2012, pastoralists from Timbuktu and Gao regions increasingly migrated to the inner Niger Delta, further putting pressure on limited resources (UNOWAS, 2018).

As a result, in recent years, rising competition over access to water and pasture between and among these groups has occurred, driven by climate change, structural land tenure mismanagement, demographic growth and a proliferation of armed actors, that, in turn, contributed to a shrinking ecosystem (Ursu, 2018; Brown et al., 2022). The competition metamorphosed into conflicts within and between groups of herders, farmers and fisherfolk (Brown et al., 2022). First, conflicts between farmers and herders are attributed to competition over access to water and the use of land adjacent to rivers or waterpoints, leading to grievances around livestock ruining crops or farming taking place across traditional herding routes. These clashes occur when livestock herds migrate back into the delta in May-June or when they leave. Second, conflicts between farmers and fisherfolk revolve around the use of flooded land, each accusing the other of extending their activities beyond the land designated to them traditionally. Third, fisherfolk and herders clash when herders are increasingly resorting to fishing as a complementary livelihood opportunity, hence increasing the competition for limited resources (Brown et al., 2022). Since livelihoods generally overlap with identity groups, disputes decrease the level of social cohesion, further fueling inter-ethnic polarization and conflict (Nagarajan, 2020).

These conflicts have been aggravated by the fact that NSAGs in the region have capitalized on tensions between and among livelihood groups. For example, in the dryland area of the delta, Fulani herders joined different jihadist groups to seek protection against self-defense groups formed by Tuaregs, Bambara and Dogon, supported by Malian security forces (Ba & Benjaminsen, 2019; 2021; Pflaum, 2021). These dynamics further fuel conflict dynamics in the inner Niger Delta and have spread in other regions (Pflaum, 2021)

Resource Availability and Access in Sikasso region

A similar dynamic between farmers and herders takes place in Mali's south. The reduced availability of pasture and water resources in the Sahelian zone has led to increased transhumant pastoralism into southern Sudano-Sahelian areas. This has often led to growing competition over scarce natural resources in receiving areas in different *cercles*² in the Sikasso region, strongly mediated by a general lack of demarcated livestock corridors and pastureland with access to water sources (Marquette, 2020; Nagarajan, 2020). A survey in two cercles, Bougouni and Koutiala, revealed that 75 percent of respondents perceived a decline in availability of pasture and water as a consequence of an increased number of transhumant herders in their community (Umutoni & Ayantunde 2018). Transhumant communities enter the region between April and July, coinciding with the beginning of the agricultural season, when farmers start sowing their crops. Farmers experiencing damage to their crops by herds, accuse pastoralists of destroying their livelihood. In response, local communities organize themselves in self-defense groups to guard fields and protect forests, leading to violent clashes (Marquette, 2020).

Gold extraction in the Sikasso region additionally decreases access to land and has severe consequences on water quality (Keita et al., 2018; Marquette, 2020). The intensive and improper use of chemicals to separate gold from other minerals, often obtained through illicit trafficking routes from Benin, Togo, Burkina Faso and Senegal, puts agriculture, fishing and herding at risk due to groundwater contamination (Marquette, 2020; Koné & Adam, 2021). In the gold-bearing Tangandougou commune in the Sikasso region, the concentration of heavy metals in the water exceeds WHO guidelines, adversely impacting human health (Keita et al., 2018). The impact further fuels local conflict dynamics,

²A cercle is the second-level administrative unit in Mali.

exacerbating insecurity, illicit financial flows, and human rights abuses, and corruption (Marquette, 2020; the International Institute for Sustainable Development, 2022). In some cases, NSAGs get involved in artisanal gold mining, making it an additional source of funding and potential recruits, further fueling conflict dynamics (ICG, 2019). Similar dynamics are found in the border region of Liptako-Gourma in western Mali (Koné & Adam, 2021)

REFERENCES

- African Development Bank (ADB). (2020). *Mali: Country Strategy Paper 2015-2016*. Completion Report Combined with the 2019 Country Portfolio Performance Review.
- Allison S. (2017). *The Sikasso paradox: Can the Mali miracle be repeated?*, Mail&Guardian, 22 September 2017, <https://mg.co.za/article/2017-09-22-00-the-sikasso-paradox-can-the-mali-miracle-be-repeated>
- Ba, B. & Bøås, M. (2017). *Mali: A political Economy Analysis*. Norwegian Institute of International Affairs.
- Basel, A., Onivola Minoarivelo, H., Craparo, A., Läderach, P. & Pacillo, C. (2021). *What is the underlying structure of the climate, conflict, and socio-economic system in Mali? A network analysis*. Climate Security Observatory Series. https://cgspace.cgiar.org/bitstream/handle/10568/116263/NA_MALI..pdf?sequence=4&isAllowed=y
- Benjaminsen, T. A. (2000). *Conservation in the Sahel: Policies and People in Mali, 1900–1998*. In Producing Nature and Poverty in Africa, edited by V. Broch-Due, and R. A. Schroeder, 94–108. Stockholm: Nordic Africa Institute.
- Benjaminsen TA, Ba B. (2009). Farmer-Herder Conflicts, Pastoral Marginalisation and Corruption: A Case Study from the Inland Niger Delta of Mali. *The Geographical Journal* 175 (1): 71–81. <https://doi.org/10.1111/j.1475-4959.2008.00312.x>
- Benjaminsen, T. A., & Ba, B. (2021). Fulani-dogon killings in mali: Farmer-herder conflicts as insurgency and counterinsurgency. *African Security*, 14(1), 4-26.
- Birkel S.D., and Mayewski, P.A. (2015). *Analysis of Historical and Projected Future Climate of Mali, West African Sahel*. Project Report. CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). Copenhagen, Denmark. Available online at: www.ccafs.cgiar.org
- Brottem, L. (2021). *The growing complexity of Farmer-Herder Conflict in West and Central Africa*. Africa security Brief No. 39. <https://africacenter.org/publication/growing-complexity-farmer-herder-conflict-west-central-africa/#:~:text=Farmer%2DHerder%20Conflicts%20in%20Mali,Region%20bordering%20northern%20Burkina%20Faso>
- Brottem, L. and A. McDonnell (2020). *Pastoralism and Conflict in the Sudano-Sahel: A Review of the Literature*. Search for Common Ground, available at: <https://www.csrf-southsudan.org/repository/pastoralism-and-conflict-in-the-sudano-sahel-a-review-of-the-literature/>
- Brown, A., Marquette, C., Cissouma, E. (2022). Water and Conflict in the Inner Niger Delta: A Governance Challenge. *Water, Peace and Security*.
- Busby, J. W., Cook, K. H., Vizy, E. K., Smith, T. G., & Bekalo, M. (2014). Identifying hot spots of security vulnerability associated with climate change in Africa. *Climatic change*, 124(4), 717-731.
- Cadré Harmonisé (2021). *Cadre Harmonisé d'identification des zones à risque et des populations vulnérables au sahel et en Afrique de l'Ouest (CH2)*. Mali. *Résultats de l'analyse de la situation de l'insécurité alimentaire aiguë actuelle et projetée*. https://docs.google.com/viewerng/viewer?https://fscluster.org/sites/default/files/documents/mali_fiche_de_communication_novembre_2021_vf_revue08122021_final_0.pdf
- Chauzal G, van Damme T. 2015. *The Roots of Mali's Conflict: Moving beyond the 2012 Crisis*. The Hague. https://www.clingendael.org/sites/default/files/pdfs/The_roots_of_Malis_conflict.pdf
- CIAT, ICRISAT, BFS/USAID. 2020. *Climate-Smart Agriculture in Mali*. CSA Country Profiles for Africa Series. International Center for Tropical Agriculture (CIAT); Bureau for Food Security, United States Agency for International Development (BFS/USAID), Washington, D.C. 25 p.
- Cooper, M. W., & West, C. T. (2017). Unraveling the sikasso paradox: Agricultural change and malnutrition in Sikasso, Mali. *Ecology of food and nutrition*, 56(2), 01–123.
- Ebi, K. L., Padgham, J., Doumbia, M., Smith, J., Butt, T., & McCarl, B. (2011). Smallholders adaptation to climate change in Mali. *Climatic Change*, 108(3), 423-436.
- European Commission. (2021). Analyse de la chaîne de valeur de la pêche au Mali. <https://europa.eu/capacity4dev/file/109500/download?token=yZNWRM20>
- FAO (2022). *Mali: Humanitarian Response Plan 2022*. <https://www.fao.org/3/cb9422en/cb9422en.pdf>
- FEWS NET (2022). *Food Security Outlook Mali. Humanitarian Assistance is Needed to improve Household Access to Food in Insecure Areas*. <https://fewsn.net/west-africa/mali/food-security-outlook/june-2022>
- FFP Fund for Peace. (2022). *Fragile States Index: Measuring Fragility*. Available at: <https://fragilestatesindex.org/>
- Food Security Cluster. (2022). <https://fscluster.org/mali>
- Global Forest Watch. (2022). Mali. <https://tinyurl.com/mpw3cn7h>
- Gorman, Z., & Chauzal, G. (2019). *Hand in hand: A study of insecurity and gender in Mali* (SIPRI Insights on Peace and Security 2019/6).

- Hegazi F, Krampe F, Seymour Smith E. (2021). *Climate-Related Security Risks and Peacebuilding in Mali*. Stockholm International Peace Research Institute (SIPRI). <https://www.sipri.org/publications/2021/sipri-policy-papers/climate-related-security-risks-and-peacebuilding-mali>
- Hummel, D. (2016). Climate change, land degradation and migration in Mali and Senegal: Some policy implications', *Migration and Development*, vol. 5, no. 2 (2016).
- ICG. (2019). *Getting a Grip on Central Sahel's Gold Rush*. <https://www.crisisgroup.org/africa/sahel/burkina-faso-mali-niger/repandre-en-main-la-ruue-vers-lor-au-sahel-central>
- ICG, (2021). *Transition au Mali: Préserver l'aspiration au changement*. Rapport Afrique N°304. <https://icg-prod.s3.amazonaws.com/304-transition-au-mali.pdf>
- IEP. (2022). *Global Peace Index 2022: Measuring Peace in a Complex World*. Sydney: Institute for Economics & Peace. Available at: <http://visionofhumanity.org/resources>
- IEP. (2020). *Positive Peace Index 2020*. Sydney: Institute for Economics & Peace. Available at: <https://www.visionofhumanity.org/maps/positive-peace-index/#/>
- IFRC International Federation of Red Cross and Red Crescent Societies. (2022). *Emergency Plan of Action*. Mali: Hunger Crisis. <https://reliefweb.int/report/mali/mali-hunger-crisis-emergency-plan-action-epoa-dref-operation-ndeg-mdrml016>
- Internal Displacement Monitoring Centre (IDMC) (2021). *Global Report on Internal Displacement 2021: internal displacement in a changing climate*. Geneva: IDMC.
- IMRAP, Interpeace. (2015). *Autoportrait Du Mali : Les Obstacles À La Paix*. Bamako: IMRAP. https://www.interpeace.org/wp-content/uploads/2015/03/2015_03_02_Mali_Autoportrait_FR.pdf
- INSTAT (2020). *Annuaire Statistique Régional du Mali 2020*. https://www.instat-mali.org/laravel-filemanager/files/shares/pub/annuaire20_pub.pdf
- INSTAT (2017). *La pauvreté à plusieurs dimensions au Mali*. Institut National de la Statistique: Bamako. https://www.instat-mali.org/laravel-filemanager/files/shares/eq/rap-ind16-17_eq.pdf
- ILO (2021). *Employment in agriculture (% of total employment) in Mali*. <https://data.worldbank.org/indicator/SL.AGR.EMPL.ZS?locations=ML>
- Keita, M. et al. (2018). Impacts of artisanal gold mining on water quality: a case study of tangandougou commune in sikasso region, Mali, *Journal of Environmental Health and Sustainable Development*, pp. 621-629
- Koné, F. & Adam, N. (2021). *Uncontrolled artisanal gold mining in Kayes is damaging the environment and fuelling trafficking and local conflicts*. Pretoria: Institute for Security Studies. <https://issafrica.org/iss-today/going-for-gold-in-western-mali-threatens-human-security>
- Marquette C. (2020). *Maintaining Peace and Stability in Mali's Sikasso Region - Strategies to Contain Land-Related Conflicts*. Bamako. <https://www.international-alert.org/publications/maintainingpeace-and-stability-sikasso-region-mali/>
- McOmber, C. (2020), *Women and climate change in the Sahel*, West African Papers, n° 27, Éditions OCDE, Paris, <https://doi.org/10.1787/e31c77ad-en>
- Mitra S. (2017). *Mali's Fertile Grounds for Conflict: Climate Change and Resource Stress*. The Hague: Clingendael Institute.
- MoFA of the Netherlands. (2018). *Climate Change Profile: Mali*. The Hague. <https://www.government.nl/documents/publications/2019/02/05/climate-change-profiles>
- Muggah R. & Luengo-Cabrera J. (2019). The Sahel is engulfed by violence. Climate change food insecurity and extremists are largely to blame, World Economic Forum Annual meeting, 23 janvier 2019.
- Nagarajan C. (2020). *Climate-Fragility Risk Brief: Mali*. Berlin. https://climate-security-expert-network.org/sites/climate-security-expert-network.com/files/documents/csen_climate_fragility_risk_brief_-_mali_0.pdf
- Nagarajan, C., Binder, L., Destrijcker, L., Micheli, S., Rüttinger, L., Sangaré, B., Šedová, B., Vivekananda, J., & Zaatour, R. (2022). *Weathering Risk climate, peace and security assessment: Mali*. Published by adelphi.
- Nimaga, Bintou. (2012). *Gender Equality and Women's Empowerment in Public Administration: Mali Case Study*. UNDP, New York. Retrieved from: <https://www.undp.org/content/dam/undp/library/Democratic%20Governance/Womens%20Empowerment/MaliFinal%20-%20HiRes.pdf>
- OECD (2022), *Environmental Fragility in the Sahel*, OECD Publishing, Paris
- Pacillo, G., Kangogo, D., Madurga-Lopez, I., Villa, V., Belli, A., & Läderach, P. (2022). *Is climate exacerbating the root causes of conflict in Mali? A climate security analysis through a structural equation modeling approach*. *Frontiers in Climate*, 200.
- Pflaum, M. (2021), *Pastoralist violence in North and West Africa*, West African Papers, No. 31, OECD Publishing, Paris, <https://doi.org/10.1787/63dff519-en>
- Robledo, C., Clot, N., Hammill, A., & Riché, B. (2012). The role of forest ecosystems in community-based coping strategies to climate hazards: three examples from rural areas in Africa. *Forest Policy and Economics*, 24, 20-28.

- Sollazzo, R. (2018). *Gold at the crossroads. Assessment of the supply chains of gold produced in Burkina Faso, Mali and Niger*. Paris: OECD. <https://mneguidelines.oecd.org/Assessment-of-the-supply-chains-of-gold-produced-in-Burkina-Faso-Mali-Niger.pdf>
- Staatz, J., Kelly, V., Boughton, D., Dembélé, N. N., Sohlberg, M., Berthé, A., Skidmore, M., Diarra, C. O., Murekezi, A., Richardson, R., & Simpson, B. (2011). *Malian agricultural sector assessment 2011*. USAID-Mali and Michigan State University.
- Théroux-Bénoni LA, Assanvo W, Maiga I, Abatan JEA, Ba F, Gnonsekan PO, Kanté A, Keita KY, Wendyam AS. (2016). *Mali's Young 'Jihadists': Fuelled by Faith or Circumstance?* Pretoria. Institute for Security Studies (ISS). <https://issafrica.s3.amazonaws.com/site/uploads/policybrief89-eng-v2.pdf>
- The International Institute for Sustainable Development. (2022). *Illicit Financial Flows and Conflict in Artisanal and Small-Scale Mining: Burkina Faso, Mali, and Niger*.
- Thompson, J. R., Laizé, C. L., Acreman, M. C., Crawley, A., & Kingston, D. G. (2021). Impacts of climate change on environmental flows in West Africa's Upper Niger Basin and the Inner Niger Delta. *Hydrology Research*, 52(4), 958-974.
- Tomalka, J., Lange, S., Röhrig, F., Gornott, C. (2020). *Climate Risk Profile: Mali*. <https://www.climatelinks.org/resources/climate-risk-profile-mali>
- Traore, B., Descheemaeker, K., Wijk, M.T. van, Corbeels, M., Supit, I. and Giller, K.E. (2017). Modelling cereal crops to assess future climate risk for family food self-sufficiency in southern Mali. *Field Crops Research* 201:133-145.
- UCDP. (2022). <https://ucdp.uu.se/country/432>
- UNCFCCC. (2018). Troisième Communication Nationale du Mali. <https://unfccc.int/documents/181335>
- UNFPA. (2020). *Demography, Peace, and Security in the Sahel: Case of Mali*. https://wcaro.unfpa.org/sites/default/files/pub-pdf/en_-_monographic_study_on_demography_peace_and_security_in_the_sahel_-_case_of_mali_1.pdf
- UNOWAS (2018). *Pastoralism and security in West Africa and the Sahel: Towards Peaceful Coexistence*. https://unowas.unmissions.org/sites/default/files/rapport_pastoralisme_eng-april_2019_-_online.pdf
- Ursu AE. (2018). *Under the Gun: Resource Conflicts and Embattled Traditional Authorities in Central Mali*. The Hague. <https://www.clingendael.org/sites/default/files/2018-07/under-the-gun.pdf>
- Raineri L. (2018). *If Victims Become Perpetrators: Factors Contributing to Vulnerability and Resilience to Violent Extremism in the Central Sahel*. London: International Alert. <https://www.international-alert.org/wp-content/uploads/2021/08/Sahel-Violent-Extremism-Vulnerability-Resilience-EN-2018.pdf>
- USAID. (2018). *Climate Risk Profile: Mali*. <https://www.climatelinks.org/resources/climate-risk-profile-mali>
- USAID. (2019). *Climate Risks in Food for Peace Geographies Mali*. https://www.usaid.gov/sites/default/files/documents/1866/DCHA_FFP_Mali_CRP_WITHOUT_adaptation_responses_10082019.pdf
- Walch, C. (2018). Disaster risk reduction amidst armed conflict: informal institutions, rebel groups, and wartime political orders. *Disasters*, 42, S239-S264.
- WBG. (2022). *Mali Economic Update. Resilience in uncertain Times: Reviewing the Social Contract*. April 2022.
- WBG, & GFDRR. (2019). *Disaster Risk Profile Mali*. https://www.gfdr.org/sites/default/files/publication/mail_low.pdf *Security in the Sahel: Case of Mali*. https://wcaro.unfpa.org/sites/default/files/pub-pdf/en_-_monographic_study_on_demography_peace_and_security_in_the_sahel_-_case_of_mali_1.pdf



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CGIAR aims to address gaps in knowledge about climate change and food security for peace and security policies and operations through a unique multidisciplinary approach. Our main objective is to align evidence from the realms of climate, land, and food systems science with peacebuilding efforts already underway that address conflict through evidence-based environmental, political, and socio-economic solutions.