

Does Climate Change Drive Land-Use Conflicts in the Sahel?

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Abstract

While climate change scenarios for the Sahel vary and are uncertain, the most popularized prediction says there will progressively be drier conditions with more erratic rainfall. According to some, an increase in violent conflicts over scarce resources should also be expected. This article investigates the climate-conflict nexus in detail, focusing on a distinct area at the heart of the Sahel, the Inland Delta of the Niger River in the Mopti region of Mali. Two complementary analytical approaches are applied. The first consists of collection and analysis of court data on land-use conflicts, 1992–2009, from the regional Court of Appeal in Mopti. A comparison of the conflict data with statistics on contemporaneous climatic conditions gives little substance to claims that climate variability is an important driver of these conflicts. Second, we carried out a qualitative analysis of one of the many land-use conflicts in the region. Again, we find that factors other than those directly related to environmental conditions and resource scarcity dominate as plausible explanations of the violent conflict. We argue that three structural factors are the main drivers behind this conflict: agricultural encroachment that obstructed the mobility of herders and livestock, opportunistic behavior of rural actors as a consequence of an increasing political vacuum, and corruption and rent seeking among government officials.

Key words: Climate change, scarcity, conflict, Sahel, Mali

Introduction

During the last few years, violent land-use conflicts in the Sahel have become the most popular example of the alleged link between global climate change and conflict. Many politicians and international civil servants seem particularly attracted to this idea (Benjaminsen, 2009). For instance, in an article in the Washington Post in 2007 UN Secretary-General Ban Ki-moon claimed that there is a connection between global warming and the Darfur conflict (Ban, 2007). The idea was also at the core of the decision to award the 2007 Nobel Peace Prize to former US vice-president Al Gore and the Intergovernmental Panel on Climate Change (IPCC). In the justification for the award, the chair of the Nobel Peace Prize Committee declared that ‘global warming not only has negative consequences for “human security”, but can also fuel violence and conflict within and between states’ and that the Sahel belt has already seen the first ‘climate wars’ referring, in particular, to clashes between herders and sedentary farmers (Mjøøs, 2007).

The idea that climate change leads to violent conflicts in general can be regarded as a continuation or revised version of the Malthusian concept of resource scarcity as a cause of environmental degradation, poverty, and an escalating struggle for resources (Homer-Dixon, 1994). Traditionally, the scarcity literature has primarily been concerned with ‘overpopulation’ and the associated ‘overuse’ of renewable natural resources (see Homer-Dixon, 1999). With global warming and the subsequent climate security discourse, the putative impact of anthropogenic climate change on the security of societies and livelihoods has gained prominence. Again, the Darfur conflict is presented as the best example of the correlation between climate and conflict. For example, Sachs (2007: 24) states that

Darfur’s extreme poverty, rising population, growing water stress and desertification are all important contributors to the Darfur crisis. (...) extreme poverty, falling incomes and failing rains ... are the crucial drivers of conflict in less developed countries; much less solid evidence implicates political repression.

Similarly, a recent report by the United Nations Environment Programme (UNEP), which received extensive media coverage and obtained political influence, also draws a link between climate change, desertification, and the conflict in Darfur (UNEP, 2007). The report attaches a great deal of importance to the fact that the average rainfall in some parts of Darfur has decreased by 16–34 percent, if the periods 1946–75 and 1976–2005 are compared, failing to mention that since the mid-1980s, rainfall has increased again (see also Kevane & Gray,

2008). Both these examples illustrate how traditional Malthusian factors and climate change are often merged into one story of ‘environmental conflict.’

This study sets out to explore the alleged relationship between climatic conditions and conflicts in the Sahel using the Inland Delta of the Niger River in Mali as a case. This is a hotspot area in West Africa in terms of land-use conflicts. It consists of a large wetland area in the midst of a dry savanna, and it is highly valuable to rice farmers, pastoralists, and fishers alike. Land-use conflicts in the delta are frequent and usually concern access to water for livestock, irrigation, fishing grounds, or access to a plot of land for farming, or grazing.

The analysis consists of two components. First, we present and assess a new dataset of more than 800 mostly non-violent land-use disputes that appeared in the regional Court of Appeal in Sévaré between 1992 and 2009. A simple comparison of the court data with statistics on contemporaneous meteorological conditions in the region offers little support for the notion that climate variability drives inter-communal conflicts. Although there seems to be some overlap in the timing of unusually wet periods and subsequent increases in land-use disputes, the overall downward trend in such cases in the Court of Appeal cannot be explained by climatic conditions. We then present a qualitative study of one of the many farmer-herder conflicts found in the delta, which serves to provide a more thorough assessment of the role of environmental conditions and to illustrate some of the causal processes that are descriptive of many of the conflicts in the area. Again, we find that factors other than those directly related to environmental conditions and scarcity of subsistence resources dominate as plausible explanations of the violent conflict. We argue that three structural factors are the main drivers behind this conflict: agricultural encroachment on key productive resources for pastoralism and on livestock corridors, decentralization creating a political vacuum, and rent seeking among government officials.

On Environmental Change and Conflict in the Sahel

Recent years have seen a surge in academic publications on whether and how particular environmental conditions and climate characteristics affect the risk of armed conflict (for reviews, see Nordås & Gleditsch, 2007; Salehyan, 2008). The question is by no means resolved, although a significant majority of generalizable empirical research suggests that the environment at best has a trivial impact on the risk of organized violence (e.g., Buhaug, 2010; Raleigh & Urdal, 2007; Theisen, 2008). This fact notwithstanding, alarmist reports by think-tanks and NGOs are flourishing, and ‘even the IPCC, which rightly prides itself of being a

synthesis of the best peer-reviewed science, has fallen prey to relying on second- or third-hand information with little empirical backing when commenting on the implications of climate change for conflict' (Nordås & Gleditsch, 2007: 628).

Few studies that claim a causal connection between environmental change and armed conflict fail to mention farmer-herder clashes in the Sahel. High-profile cases include the border conflict between Senegal and Mauritania in 1989, the Darfur conflict, and recent clashes between ethnic groups in northern Nigeria. Many of these inter-communal conflicts are violent, and some have generated massive casualty figures. There may be several reasons for the prevalence of land-use conflicts in the region. One important factor is the juxtaposition of communities with different lifestyles and economic activities, whereby the conflicts in this way are an expression of ongoing agrarian changes (modernization) in Sahelian societies. In addition, the local population, and notably herder communities, may have little confidence in the government's ability and willingness to solve conflicts in a peaceful and just manner (Benjaminsen & Ba, 2009; Benjaminsen, Maganga & Abdallah, 2009).

There is a rich body of case study literature on dryland conflicts that focuses on the relationship between farmers and herders in Africa (e.g., Bassett, 1988; Benjaminsen & Ba, 2009; Benjaminsen, Maganga & Abdallah, 2009; Hagberg, 2005; Hussein, Sumberg & Seddon, 1999; Moritz, 2006; Turner, 2004; Witsenburg & Adano, 2007). In the case of local conflicts, national policy narratives often put the blame on pastoralists. This seems to be part of an overall strategy of agrarian modernization and of converting mobile peoples into 'productive' sedentary farmers. Such policies have been criticized by scholars pointing out that the causes of conflicts often have a political origin (Bassett, 1988; Benjaminsen, 2008; Turner, 2004; Moritz, 2006), which is associated with an ongoing process of pastoral marginalization (Benjaminsen & Ba, 2009; Benjaminsen, Maganga & Abdallah, 2009, Bonfiglioli & Watson, 1992; Hagberg, 2005); underestimation of pastoral productivity and pastoral contribution to the national economy (Grandin, 1987; Hesse & MacGregor, 2006); and overestimation of negative impacts of grazing on the ecology (Behnke, Scoones & Kerven, 1993; Ellis & Swift 1988; Turner, 1998). In fact, specialized pastoralists may be just as healthy and may feed their families just as well or better than farmers in the same dryland environments (Fujita et al., 2004; Pedersen & Benjaminsen, 2008).

Although farmer-herder clashes represent the archetypical image of Sahelian disputes, different actors may be involved in these conflicts, and as we will show, most of these conflicts do not lead to violence.

The Inland Delta of the Niger River

This delta is the largest wetland area in West Africa that in good years covers up to 30,000 km² (Figure 1). The flooding in the delta depends on the annual rainfall in the upper catchment area of the Niger River in Guinea and southern Mali. For centuries, the area has provided rich resources for rice cultivation, fishing, and pastoralism. According to official censuses, the population of the Mopti region, which covers most of the delta, increased from 910,713 in 1964 to 1,478,505 in 1998 (Cotula & Cissé, 2006). An assessment report forecasted that the delta population would reach 2 million by 2010 (Sahel Consult, 2007). The region consists of a mix of sedentary farmers (Bambara, Songhay, Malinké, Fulani), pastoralists (Fulani, Tuareg, Maure), and fishers (Bozo). These communities have a long tradition of cooperation and coexistence, though inter-communal raids and clashes have also happened from time to time.

[INSERT FIGURE 1 ABOUT HERE]

The pastoral system in the delta is based on livestock using pastures in the delta as a dry season grazing area during December-June combined with migration to dryland pastures in the rainy season. In the Sahel, pastoral migration among the Fulani may range from 40 to 500 km (Turner, 1999a). From the beginning of the rainy season in June/July, many delta pastoralists move northeast or northwest before they return to the delta during the dry season.

The main fodder resource in the delta is *burgu*, which grows on deeper water than paddy rice. During the last decades paddy fields have expanded considerably at the expense of *burgu*. According to Kouyaté (2006), about one quarter of the *burgu* areas in the delta have been converted to rice fields since the 1950s. This can be explained in part by decreased levels of flooding in the Niger River, especially as a result of the droughts of the 1970s and 1980s, and partly by the construction of the hydropower dam upstream at Sélingué that was completed in 1982 (Cotula & Cissé, 2006; Turner, 1992). Since the Sahel drought of the mid-1980s, flood levels have increased somewhat again (Figure 2).

[INSERT FIGURE 2 ABOUT HERE]

Recent environmental change in the delta region

The Sahelian zone is generally considered highly vulnerable to climatic fluctuations due to the strong dependence of its population on rain-fed agriculture and livestock keeping. The recurring droughts of the 1970s and 80s had devastating implications for livelihoods across the region, where hunger, malnutrition, diseases, and loss of lives and livestock led to massive human displacement. The conditions have since improved and seasonal rainfall has increased again, although the region is still marked by significant inter-annual variations in rainfall (Buontempo, 2009; Kandji, Verchot & Mackensen, 2006). As a result of this relative recovery in rainfall, environmental research on the Sahel has shifted from focusing on ‘desertification’ to acknowledging the fact that the region has become greener during the last two decades (e.g. Hutchinson et al., 2005).

Although there is general agreement on the long-term climate developments in the region throughout the 20th century, researchers are much less certain about future changes. This is underlined by the IPCC in its fourth report (Boko et al., 2007: 444), which points out that the various models do not concur concerning future climate scenarios for the Sahel. While some models indicate that the region will become drier, other models suggest that Sahelian rainfall might increase in the future (e.g. Haarsma et al., 2005; Odekunle, Andrew & Aremu, 2008). Projections for temperatures tend to be more uniform than for rainfall and suggest an increase, especially for the summer season (Buontempo, 2009).

Figure 3 illustrates short-term climate variability in the Mopti region of Mali during the period 1960–2008. The rainfall estimates are derived from a gauge-based dataset of total annual precipitation (millimeter) for the global land surface at 0.5° x 0.5° grid resolution, published by the Center for Climatic Research at the University of Delaware. This figure shows data from the grid cell covering the geographic center point of Mopti (although aggregated data for Mali display a quite similar temporal pattern). Local temperature estimates (°C) for Mopti were generated in a similar manner from the same source. Several aspects are worth noting. First, the graph reveals substantial inter-annual variability in precipitation – so characteristic of the Sahel belt – with dry and wet years in an irregular pattern. Second, the Sahel drought of the 1970s and 80s is easily detectable in Mopti meteorological statistics, with the early 1980s displaying particularly large negative deviations in rainfall. The driest years in the period lost almost 150 mm from the yearly average (1961–90) of 487 mm

(dotted line), equivalent to 1.4 standard deviations below the mean. Since 1990, precipitation has normalized, including some very wet years. These trends do not provide any evidence of global climate change having played a role in driving the droughts of the 1970s and 80s (Christensen et al., 2007).

As expected, the temperature data display less dramatic variability over time although a significant overall warming is discernible, especially early in the period. Only three years since the mid-1970s have been colder than the long-term annual mean temperature of 28.6 degrees Celsius (dotted line).

[INSERT FIGURE 3 ABOUT HERE]

Land-Use Conflicts in the Delta

The current land tenure system in the delta is based on the principles introduced by invading Fulani warriors in the 14th century, the so-called Ardobé (Ba & Daget, 1962). The Ardobé constituted the military and political leadership in the area for more than four hundred years, from about 1400. They ‘provided floodplain land to subordinates for farming, which led eventually to the bounding of their spheres of influence into leyde’ (Turner, 1999a: 110). Furthermore, the Ardobé introduced local chiefs (*jowros*) to manage the *leyde* (sing. *leydy*). The *jowros* who were noble Fulani (*rimbé*) pastoralists were ‘owners of grass’, and hence responsible for the management of pastures in these territorial units.

In 1818, Islamic clergymen mobilized a jihad and conquered the delta region through the leadership of Cheikou Amadou. This resulted in the establishment of an Islamic theocratic state, the Dina, based in Hamdallahi south of Mopti. The Dina also codified and formalized many of the resource management principles and rights introduced by the Ardobé. For instance through this codification, the *jowros* were formally granted the authority to manage the *leyde*, rights to *burgu* fields were defined, and a list of livestock entry routes in the delta was established in order to keep farmers’ fields at a distance (Gallais, 1967).

In 1895, the colony of French Sudan was established. The principles of spatial organization and resource management inherited from the Dina were sustained by the French administration (Barrière & Barrière, 2002; Vedeld, 1997). The French governed the delta through the authority of *jowros* by letting them maintain their role as managers of pastures. The colonial government also agreed that the *jowros* were entitled to receive a rent from the users of *burgu* pastures.

In 1960, Mali gained independence, and the country's first President, Modibo Keita, was inspired by socialist ideas of industrialization and agricultural modernization. Pastoralism was looked upon as an obstacle to development and the Keita government sought to convert pastoralists into 'productive' citizens by taking up farming (Benjaminsen, 2008; Benjaminsen & Berge, 2004). The socialist government also saw the jowros as feudal landlords and generally tried to undermine their authority. After a coup d'état in 1968 and the establishment of the military government of Moussa Traoré, the position of jowros was gradually rehabilitated. Towards the end of Traoré's reign, until he was toppled in another coup d'état in 1991, the jowros had again become powerful local actors through alliances with officials of the governing party.

After the introduction of democracy in 1991, a Constitution committed to decentralization was accepted by referendum (1992), and in 1993 and 1995 laws on decentralization were adopted by the National Assembly. However, how to deal with land-use conflicts remains one of the key challenges of the decentralization reform.

In French Sudan, the state and individuals with title deeds were the only formally recognized landowners. After independence, as a heritage from colonial law, the Land Code of 1986 acknowledged property rights only in the case of individually held title deeds. Customary rights were defined as use rights with a much weaker status than titled land. In 2000, the Land Code of 1986 was replaced by a Land Ordinance.¹ However, this new law remains focused on 'mise en valeur'² and does not address pastoral land tenure and its various challenges. The livestock policy of 2004 is also largely focused on modernization of the livestock industry and for instance neglects land-use conflicts as an issue.

A number of reports hold that in recent years the delta has been marked by numerous land-use conflicts (Ba, 1996, 2008; Barrière & Barrière, 2002; Benjaminsen & Ba, 2009; Cotula & Cissé, 2006; Moorhead, 1991; Turner, 1992). Given the area's sensitivity to rainfall fluctuations and its dependence on the seasonal flooding of the Niger River, one might surmise that the high frequency of land disputes in part reflects a decline in the water level in the river. A possible, and often repeated scenario in Mali, is that declining water levels lead to

¹ In French legislative terms, a *loi* is a piece of legislation enacted by vote of the National Assembly, an *ordonnance* is enacted by the head of State, a *décret* is an executive order, often used to clarify a loi or ordonnance or to provide the guidelines for its application, and an *arrêté* is formulated and promulgated at the ministerial, or even the regional level (Elbow & Rochegude, 1990).

² Increasing the value of land through productive use, which usually means farming.

less land available for rice cultivation and burgu pastures, which in turn lead to more land-use competition, especially between farming and pastoralism. However, lack of systematic data on such conflicts has prevented a systematic comparison of trends in conflict and climate.

Court data on land-use disputes

For this study, we consider data on land-use disputes settled by the Mopti regional Court of Appeal in Sévaré. The data were collected by Koffi Alinon between November 2009 and February 2010. We chose the Court of Appeal as our source of conflict data because its domain covers a larger area (and hence a larger number of cases) than individual Primary Courts and because it is common practice in Mali that the losing party in Primary Court takes the case to the Court of Appeal.³ Hence, little information is lost by focusing only on cases in the second tier of the judicial system. We considered using newspaper reports and statistics from the local police as additional sources. The former are, however, infrequent and unreliable, and the latter are difficult to access and would only include cases that involved use of violence.

The archives in Sévaré have not been digitalized; instead, court decisions are available as printed documents, catalogued by year and type (criminal or civil matters). Since the Appeal Court in Sévaré was established in 1992, we only report data on disputes starting from this year. Land and natural resource conflicts are normally recorded under civil matters, although violent land conflicts may be considered criminal matters. We disregard all cases relating to divorce, matrimonial quarrel, credit reimbursement, and succession, except if the succession concerns ownership of rural land. The remaining files were classified according to the main issue of contest (agricultural lands, pastures, fisheries, and customary leadership) and actor constellation (farmer/farmer, farmer/herder, etc.). In all, we have data on 820 distinct land/resource disputes in the region between 1992 and 2009.

Before assessing the statistics, a note on data quality is warranted. Taking a dispute to court is usually considered a last resort (except if an involved party has enough power and money to be confident of victory). Obviously, most land (and other civil) disputes never appear in court – many are solved through various conflict resolution mechanisms, such as intervention of customary authorities (jowros, village leaders, community meetings) or local administrative authorities. In addition, some enduring conflicts are never taken to court due to lack of funds.

³ One of our key informants, a lawyer defending cases at the Court of Appeal, estimated that well above 90 % of the land-use conflicts in Primary Courts are appealed and taken to the next level.

Court cases are expensive, largely because of the bribes the parties need to pay to the judge and his entourage (Benjaminsen & Ba, 2009). This suggests two possible selection biases. First, the data might be biased in that disputes involving very poor parties will be underrepresented. Second, there is a potential for bias relating to conflict severity, where high-intensity disputes, i.e. violent and fatal events, are more likely to appear in court. According to our sources, violent cases represent about 10 percent of all cases in the Court of Appeal in Sévaré.⁴ While this share may seem rather low, it is likely to be considerably lower for non-court land-use conflicts in the delta. A final caveat concerns the temporal dimension – the time it takes from a dispute materializes until a verdict is reached in the Court of Appeal.⁵ Given that this study seeks to explore the sensitivity of rural communities to short-term variations in environmental conditions, the timing of dispute onset might be more important than the date of court decision per se.

These concerns are all real, yet we do not regard them as sufficiently grave to question the overall merit of this assessment. First, our data show that about two-thirds of all cases appeared in the Court of Appeal within two years of the stated starting date of the dispute (according to the parties involved). Less than 6 percent of all filed conflicts lasted for more than five years before a court decision was made. Hence a comparison between frequency of land disputes and contemporaneous climate statistics should reveal a co-variation pattern if the two phenomena are linked in a systematic manner. Second, while the data might be skewed in direction of more affluent conflict parties and more severe events, we have no indication of sample selection bias with regard to the distribution of conflict types, or, more crucially, the relevance of environmental conditions for the occurrence and timing of conflicts.

An overwhelming majority of court cases (83 percent) list agricultural fields as the main issue of contestation. This corresponds to the fact that about 70 percent of all cases are disputes between farmers (Table I). These conflicts originate for instance from two individuals claiming rights to the same field, disagreement about borders between fields, or disagreement about the management of communal fields. We also note that conflicts between farmers and

⁴ This is based on an assessment by a lawyer who has specialized on this type of land-use conflicts and who appears in the Sévaré Court of Appeal every week.

⁵ The starting point of a conflict might be difficult to define in itself and there might be different interpretations of when a conflict materializes among various actors. In violent conflicts, the starting point may be defined as when violence first broke out or when the parties first disagreed. In a non-violent conflict, the onset is either interpreted as when the case was brought to the authorities or when the parties first disagreed over access to the resource in question.

herders only represent about 12 percent of the cases in our material. There are two main origins of these conflicts: livestock corridors being blocked through agricultural extension and encroachment of rice cultivation on burgu pastures. We should, however, add a caution to the counting of cases; while conflicts between farmers are usually smaller conflicts opposing individual farmers, farmer-herder conflicts are larger disputes opposing communities. Each of these latter conflicts therefore has more serious consequences for more people and they are also at the center of on-going processes of agrarian change in Sahelian societies.

[INSERT TABLE I ABOUT HERE]

Farmer-fisher conflicts are usually about fisher folk's access to agricultural land. Disputes among herders may be about the management of burgu pastures, disagreement about the limits of leyde and of burgu pastures, refusal to pay fees to graze animals on burgu pastures, and refusal to respect the established cycle of entry and exit dates related to burgu pastures. Herder-fisher conflicts are often either about burgu pastures being extended into fishing grounds or about animals grazing in the water and causing damage to fishing gear. Finally, conflicts among fishers are usually about the management of fishing grounds or the usage of fishing gear (for different types of conflicts in the delta, see also Barrière & Barrière, 1995).

Next, we inspect the aggregate temporal pattern of land and resource conflicts, relative to general civil disputes for all years since 1992 (Figure 4). As one might expect, we see a sharp increase in appeal court cases in the years following the political reforms of 1991–92. This probably reflects both increased opportunities for taking disputes to the court system and increased confidence in the judicial system in Mali.⁶ Since the peak in 1995, the number of relevant court cases dropped considerably and it now appears relatively stable at around 20–30 cases per year (despite a notable rise in 2009). Most interestingly, however, we see that the trend in land-use disputes is remarkably similar to the temporal pattern in general civil disputes (petty crime, divorce, etc). This provides at least indicative evidence that factors other than environmental conditions drive the temporal fluctuation in land disputes in the Court of Appeal in Sévaré.

[INSERT FIGURE 4 ABOUT HERE]

⁶ The average age of court cases were higher in 1993 (4.1 years) than in any other year in the sample period, suggesting that conflicts had accumulated for several years when opportunities and/or motivation for bringing the conflict to the court suddenly increased. The sample mean age of resolved disputes is 2.8 years.

Finally, in Figure 5 we compare the annual frequency of tenure disputes with rainfall statistics for the Mopti region. However, instead of using data on court settlements (as in Figure 4), we consider conflict *outbreaks*, i.e. the number of disputes that started in year (solid line). We believe the timing of land-use dispute onsets is more relevant than when they eventually appear in court (although bringing a conflict to court may be seen as an escalation of the conflict, which plausibly might be related to increasing strains on rural livelihoods). The rainfall data are expressed in standard deviations from normal annual levels (dashed line) during the reference period 1961–90. We apply a one-year time lag to the climate data to account for a slight delay in a possible effect of environmental ‘shocks’ on land/resource conflict. Let us be clear: a simple bivariate comparison of trends certainly cannot be used to demonstrate or falsify hypothesized relationships. Yet, a visual correlation between pairs of phenomena might provide some hints at a connection that requires further scrutiny.⁷ Conversely, a complete lack of temporal correspondence is indicative of a trivial association, (although it is entirely possible that the relationship between x and y is conditional on a third factor z).

Figure 5 gives little reason to suspect that short-term climatic anomalies are an important driver of land-use disputes in the Mopti region. While precipitation has remained relatively stable during the observation period (although with notable inter-annual variability), there is a distinct downward trend in the number of land disputes breaking out and taken to court. At the margin, however, we may be able to decipher a weak overlap in trends as local peaks in new disputes (1994–95, 1999, 2004, 2008) appear to follow unusually wet years. This could reflect a pattern whereby wetter years lead to an expansion of the pastoral area and resources of potential contestation, covering new land with less established norms of sharing, which in turn increases the overall number of land-use conflicts. However, we would be hesitant to claim such a causal link for several reasons. First, the visual inspection covers less than two decades, which really is a too short time period for determining a systematic pattern of covariance. Second, the graph ignores possibly important third factors, such as contextual socio-economic developments. Third, our measures of local environmental conditions and ‘shocks’ are based on climatological statistics and hence do not capture directly the impact on crops and livestock as well as the floodplain of the Niger River. Also, there may be

⁷ The most influential correlates of civil war in a multivariate framework also correlate significantly with the outbreak of civil war at a bivariate level (see Hegre & Sambanis, 2006).

uncertainties in the coding of land dispute onset (which is based on the accusers' formal statements in the Appeal Court) (see also footnotes 5 and 11).

We should also note that the decline in the outbreak and settlement of land-use disputes in the Court of Appeal in Sévaré goes against the idea of increasing numbers of land-use conflicts in the delta expressed by some observers. This might be reflecting a real trend, but it might also be the result of a loss of confidence in the court system among the local population and/or increasing obstacles to bringing a dispute to court.

[INSERT FIGURE 5 ABOUT HERE]

In sum, the data from the Court of Appeal in Sévaré and local climatic statistics give little substance to claims that short-term variability in weather patterns drive social conflicts among pastoral and agrarian societies in rain-dependent environments. Yet, the somewhat crude climatological data (using annualized measures on rainfall and temperature as proxies for water scarcity and drought), the short time-series of the court data (e.g., missing the Sahelian drought of the mid-1980s), and the rather simple manner in which the two have been compared (ignoring contextual and intervening factors) imply that we cannot conclude definitively in one direction or another based on these statistics alone. Hence, we next present an in-depth study of inter-communal relations and land conflicts in the Mopti region that may be better suited to identify important conflict processes and assess the true impact of climate variability.

A Case Study⁸

6 August 2001, at sunrise, near the village of Karbaye in central Mali: young men from the village wait with rifles in the bushes and open fire at a group of herders who bring livestock to a pond close to the village. Some three to five people are killed and 15–30 injured in the skirmish that follows. Most of the killed and injured are herders who came from the neighboring village of Guirowel.

The two villages are located approximately one kilometer apart (Figure 6) and situated in the leydy of Kounary in Mopti Region. Guirowel is primarily a pastoral Fulani village while in Karbaye the majority are Malinké farmers. There are approximately 400 inhabitants in

⁸ This case study is based on fieldwork by Jill T. Buseth between October 2008 and March 2009. Data collection consisted mostly of interviews with key actors both locally (farmers and herders) and in the government and NGOs. In total 55 interviews with villagers were carried out (about half in each of the two villages). In addition, 21 interviews with government officials, NGO representatives, and resource persons were undertaken.

Karbaye and about 1,070 in Guirowel (Direction Nationale de la Statistique et de l'Informatique, 1998). Even though 'farmers' may also own livestock and 'herders' may also farm (or at least control farm land), these two identities still hold a strong position in Mali and in the delta area. Farmers in Karbaye cultivate paddy rice on flooded land in addition to the growing of rain-fed millet, fruits, and vegetables, while burgu pastures represent a key resource for pastoral production.

Several development interventions have been implemented in this area during the last decades. The *Office Riz Mopti* (ORM) was established in 1972 with World Bank funding, as part of a large national initiative aiming at increasing agricultural production. ORM has focused on transforming 'vacant' land into rice fields and the building of irrigation systems to distribute water to plots of one hectare each, which people can rent. ORM established a large *casier rizicole*⁹ outside Karbaye in 1977. This perimeter of 900 hectares was traditionally burgu land established during the Dina. The area is, however, far from the river, and in the 1970s, it was not flooded adequately because of the droughts. ORM therefore regarded the land as underutilized and transformed it into rice fields.

Opération de Développement de l'Élevage dans la région de Mopti (ODEM), which was established in 1975, was another World Bank funded development initiative. ODEM was concerned with livestock problems and pastoral development (de Brujin & van Dijk, 1995; Shanmugaratnam et al., 1991). As the herders of Guirowel had lost access to burgu pastures after the establishment of the *casier rizicole*, ORM and ODEM re-transformed the *casier rizicole* back into the original *casier pastoral* in 1984. This is the main site of contestation in this conflict. In addition, there is the point where a *burtol* (livestock corridor) enters the *casier* (Figure 6). The *burtol* runs from Guirowel past Karbaye and enters the *casier* where there is presently a dam and a garden with the production of vegetables by farmers from Karbaye. In April 2001, the Canadian Environmental Rehabilitation and Food Security Project (RESA) assisted in rehabilitating the dam that had dried out. It had earlier been used for brick production, household consumption, and the watering of livestock by all the surrounding villages, but mostly Karbaye and Guirowel. All villages agreed on the rehabilitation of the dam on the condition that they would get access to it. Villagers of Karbaye, however, regarded the dam as theirs as it was located on the border to their village land. They had also paid half of the costs, while the other villages paid the other half. Total cost for the

⁹ *Casiers* are large zones of land set aside for specific purposes, mostly pastoral grazing (on *casier pastoraux*) or rice cultivation (on *casier rizicoles*).

rehabilitation was 200,000 CFA (about 340 euro). As Figure 6 shows, the dam is situated on the border of the casier pastoral where the burtol enters the casier. The purpose of the dam is largely disagreed upon, but according to Canadian project staff, it was intended to facilitate both fruit and vegetable farming, and serve as a source of water for livestock.¹⁰

Shortly after the establishment of the dam, people from Karbaye allegedly announced that other villagers were not allowed to use it. Farmers from Karbaye thereafter started to cultivate vegetables and fruits in gardens next to the dam. They also prohibited the watering of livestock, as animals would damage the gardens. In addition, the gardens also started to encroach on the burtol, eventually blocking it for any passage.

Herders from Guirowel did not accept, however, that access to the dam was denied and that the burtol leading to the casier pastoral with burgu pastures was blocked. They felt they had the right of access to the dam, as they had contributed to its financing. Many people in Karbaye, on the other hand, believed that the only reason the herders insisted on using the dam and the burtol was to provoke, and not because they necessarily depended on the water resource.

[INSERT FIGURE 6 ABOUT HERE]

The violence between Guirowel and Karbaye took place next to the dam, just outside Karbaye, on the livestock corridor, and only 20–30 meters from the casier pastoral. The two villages largely disagree on what happened before and during the conflict. The common story from Guirowel was: *The farmers do not accept that we want to pass with our animals. They just want all the land for themselves, and one morning they started shooting at us when we came. They had planned this slaughter for several months. They don't accept that the casier pastoral is ours.*

Many people from Karbaye claim that it was the other way around. However, even several informants from Karbaye admitted that it was farmers from Karbaye who opened fire, but they were reluctant to talk about it, and they also claimed that they had no choice.

The violent attack at Karbaye occurred in August 2001. Neither 2000 nor 2001 were dry years. Both years had around average rainfall (414 mm in 2000 and 453 mm in 2001) and we

¹⁰ Information from the Canadian donor was obtained from email correspondence with one employee of CIDA's Mali program based in Canada in 2009.

have no other indication that anything but normal environmental conditions prevailed at the time violence broke out. Thus, instead of interpreting this event as a classic scarcity-driven conflict, we argue that several dominant structural factors are essential in understanding this particular conflict – and numerous other low-intensity conflicts that occur in the delta. The first factor is the large-scale expansions of rice fields, which has led to a massive loss of pastoral land; the second is a political vacuum that prevailed following democratization and decentralization from 1991; and the third is corruption and rent seeking by government officials.

Large-scale expansions of rice fields and loss of land

The expansion of rice fields is primarily a result of national agricultural policies promoting rice cultivation at the expense of pastoralism, but it has also to some extent been caused by a decline in flood levels in the river. Lower water levels were partly caused by a decrease in rainfall during the 1970s and 80s, which left large areas of the floodplain dry. The construction of the upstream hydropower dam at Sélingué in 1982 also contributed to the declining water levels (Cotula & Cissé, 2006; Turner, 1992). As burgu grows on deeper water than rice, the declining water level led to a massive expansion of rice fields into burgu areas on the floodplain, which directly confronted farmers and herders and pushed out the latter and their livestock.

Land legislation and policies largely favor farmers at the expense of herders. This is clearly illustrated by the ORM projects. Studies in other parts of the delta have shown that agricultural encroachment is a continuous process and a major threat to the pastoral system (e.g. Benjaminsen & Ba, 2009; Cotula & Cissé, 2006; Legrosse, 1999; Turner, 1999b). For instance, a herder in Guirowel said: ‘I don’t know if the ORM benefited the farmers, but I know one thing: It destroyed the land of the herders!’

This case is, however, unique in the way it led to a re-transformation of a rice field into burgu pastures. The farmers reacted strongly to this decision and it was not enforced by the government. According to the local mayor, all the surrounding villages except Karbaye agreed on establishing a casier pastoral, because it was regarded as highly necessary in order to give the herders some land for grazing. The farmers were given new areas about 7 km away where they could cultivate, but most farmers did not accept this, and continued to cultivate in the casier pastoral. Because of the general agricultural development policies encouraging expansion of rice fields, farmers felt that they had the authorities on their side.

Hence, farmers from Karbaye continued to cultivate the casier pastoral, and every year cattle from Guirowel damaged the harvest, and nothing was done to solve the problem. Both herders and farmers felt they held priority rights to the land.

Conversions of pastures to rice fields are mainly the result of the general policy and laws of '*mise en valeur*' favoring agriculture at the expense of livestock keeping. Land laws that authorize state ownership and marginalize customary practices have since colonization played a key role in the on-going exclusion of pastoral use. This situation is not particular for Mali. In fact, pastoral marginalization as a result of agricultural policies and land legislation favoring farmers is a well-known phenomenon in the African studies literature (see e.g. Bonfiglioli & Watson, 1992).

In the area around Mopti and Sévaré, where this case study was carried out, the main agent to implement the policy of agricultural expansion has been the ORM. One of the jowros interviewed estimated that about 80 percent of the leydy of Kounary is currently cultivated, while at most 40 percent was cultivated at independence. People interviewed also stress that neither farmers nor livestock keepers were consulted when ORM confiscated burgu land and closed livestock corridors.

Political vacuum

Following democratization and decentralization in Mali, the management of the casier pastoral in question and the dikes were in 1998 handed over to a customary organization called *Association Boumani*, which is focused on conflict resolution. It consists of three representatives from each of the villages surrounding the casier pastoral. As this organization does not have a formal or official status, it soon faced problems in terms of lack of authority in carrying through its recommendations.

It became easy for farmers to cultivate in the casier pastoral following this lack of governmental management, monitoring, and policing. Moreover, when Karbaye wanted to rehabilitate the dam, there was a lack of officials who could participate in the preparations and discussions in advance. Judging from the timing of the rehabilitation of the dam (April 2001) and the eruption of violence (August 2001), it seems likely that the rehabilitation may have

sparked the violent attack, though tension between the two parties had been latent for decades.¹¹

Many informants stated that the conflict was caused by what they called a ‘lack of authorities’ in the sense of lack of state presence in the area. One key informant said that ‘the conflict is related to the fact that now, everybody is free and can do what they want’, referring to uncertainty and confusion after the reforms. Another said: ‘It is a farmer-herder conflict that is caused by the government’. Hence, many blame the authorities and their ambiguity in the allocation of the casiers for the conflict.

In the first few years after the introduction of democracy in 1991, government presence in rural areas was weak and there was considerable uncertainty about future directions with the restructuring of government services and decentralization. Some people took advantage of this void by taking possession of land or by making claims to land in various ways.¹² Expansion of farmland at the expense of pastures caused by a growing population is a common phenomenon throughout Africa. The droughts led to a more rapid encroachment of rice fields into burgu areas, while decentralization in the beginning created an uncertainty around future power structures and policies. This led actors to try their luck and make claims to land in various opportunistic ways.

Rent seeking

‘Rent seeking’ implies extracting value from activities without making any contribution to productivity, and it is usually linked to the misuse of governmental authority. Corruption by a rent-seeking bureaucracy is also perpetuating land-use conflicts in Mali. For instance, in order to open up a new livestock corridor, a jowro has to pay off a number of state technicians and administrators. One well-informed interviewee in a key position said that the administration benefits from the fact that jowros hold only informal positions. As long as they only have informal power, they need the support of the administration in order to be able to manage pastures effectively. This support is obtained through payments. ‘A jowro who tries to be

¹¹ One could, however, question whether this conflict started when the violence broke out in August 2001 or whether it was the building of the dam in April 2001 that sparked off the dispute. The starting date could also have been in 1977 when the casier rizicole was established, in 1984 when the casier again became a grazing area, or some time after 1991 with decentralization and decreased government presence in the rural areas. This case, thus, also illustrates some of the problems with identifying a starting point of a dispute in general.

¹² Several interviewees said that every time there is a change of power, land claims and conflicts increase. This supports the notion by Bierschenk & Olivier de Sardan (2003: 152) that ‘(e)ach change of political regime at the national level opens the way for the emergence of new local political institutions and new actors on the local political scene.’

correct without paying off the administration will never be able to do anything', the interviewee said.

The yearly entry of livestock into the delta, the dates of which are discussed at annual conferences and widely announced, is a particularly lucrative business. At this occasion, herders pay fees per head of livestock to the jowros at the various entry points. At the entry dates, key politicians and public administrators tend to show up to claim their shares of the income. In fact, some jowros are said to distribute all the income from these occasions just to keep the powerful people on their side. This corroborates Turner (2006: 61) who states that '(e)ach year virtually all of the money [the jowros] obtain in the form of pasture taxes is spent in the form of bribes.' By distributing these bribes, the jowros establish relations with administrative officers that are indispensable. It has often been stressed to us that the one who pays the most to the administration is also the one who will be most listened to. This also goes for the legal system. Benjaminsen & Ba (2009) report that both sides in a court case they studied complained about all the expenses involved. Millions of FCFA were spent by the parties to cover lawyer fees, court fees, and bribes to judges. Through receiving payments from both parties, the courts' decisions become ambiguous. This again contributes to perpetuating conflicts. In our research, we have often heard complaints that the rural population has become milking cows for state officials.

When asked why the farmers of Guirowel are still using the land in the casier pastoral that was allocated to the herders, one informant replied: 'You see, both farmers and herders give money to the authorities.' A judge in the Appeal Court said that corruption is a very important aspect of this conflict and of farmer-herder conflicts in general in the area. He said: 'I do not have proof of corruption, but these conflicts would have been very easy to solve, so it is not difficult to see.'

What is perceived by rural actors as lack of government interest in solving land-use conflicts and the subsequent lack of trust in the government among the rural population can explain why the farmers chose to use violence in this particular case. In a comparable case in Tanzania, Benjaminsen, Maganga & Abdallah (2009) demonstrated a vicious circle of corruption and lack of trust in the government, which again paved the way for local action including the use of violence to defend one's rights to a contested resource.

Conclusions

This paper has investigated the roles of climate variability and environmental conditions on land-use conflicts in Mopti region in Mali – a heartland of the Sahel. To this end, we collected new data on land-use disputes in the Regional Court of Appeal, which we compared to contemporaneous climate statistics. Moreover, we carried out a detailed case study of one of the conflicts in the delta, to obtain a more thorough understanding of important factors contributing to the outbreak of the dispute. These complementary analyses provide little evidence supporting the notion that water scarcity and rapid environmental change are important drivers of inter-communal conflicts in the Sahel. The statistical comparison of temporal variations in rainfall and variations in land-use disputes in the Court of Appeal revealed little overlap in trends. Tellingly, civil cases, which presumably are less sensitive to climatic variations, followed the same fluctuating pattern as land disputes. We interpret this finding as indicative evidence that land-use conflicts in the delta region are shaped by political and economic contexts (e.g., confidence in the judicial system, economic opportunities, and learning) rather than climate variability.

The results from the case study of the farmed-herder conflict in Karbaye corroborate this conclusion. Rather than being driven by exogenous pressures on the fertile land, we see this conflict as a result of several structural conditions that are likely to shape a large number of land-use conflicts across the Sahel. First, there is agricultural encroachment on productive key resources for pastoralism and on livestock corridors obstructing the necessary mobility of herders and animals. This has led to massive loss of dry season pastures that are essential for the survival of the pastoral system. This trend is primarily caused by agricultural policies and laws promoting farming at the expense of pastoralism. Second, decentralization from the early 1990s caused a political vacuum that led rural actors to follow opportunistic strategies to claim ownership of land and natural resources. Third, rent seeking among government officials has undermined rural people's trust in government institutions and the willingness and interest of officials to solve conflicts. This lack of trust may have contributed to some actors taking action on their own, including using violence to lay claim to resources.

When it comes to the effect of environmental variability on the onset of conflicts, we have observed two different and contrasting scenarios. First, the Sahelian droughts of the 1970s and 80s led rice farming to move down the riverbed and encroach on the dry season burgu pastures. In this sense, a drought may play a role in confronting farmers and pastoralists and increase inter-communal tensions and, quite possibly, escalate latent conflicts to the use of

violence. Conversely, as indicated in Figure 5, good rainfall years with generous flooding might also induce more conflicts as the area of potential contestation is expanded to areas with less established norms of ownership and control. The key factor in avoiding both these scenarios would be better policies and laws recognizing the needs of pastoralists and generally improving the relationship between the government and rural populations.

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Tables and Figures

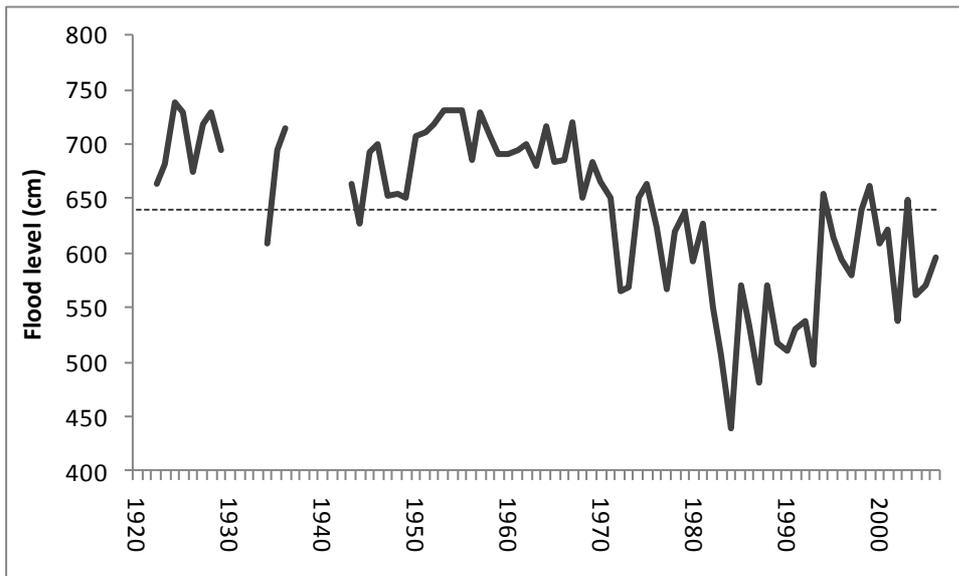
Table I. Land-use conflicts in the Sévaré Court of Appeal by type, 1992–2009

	Farmer	Herder	Fisher
Farmer	573 (69.9%)		
Herder	100 (12.2%)	19 (2.3%)	
Fisher	63 (7.7%)	13 (1.6%)	50 (6.1%)

The table shows the frequency of conflicts by actor constellation; share of all recorded events given in parenthesis. Two disputes involving other actors not listed. N=820.

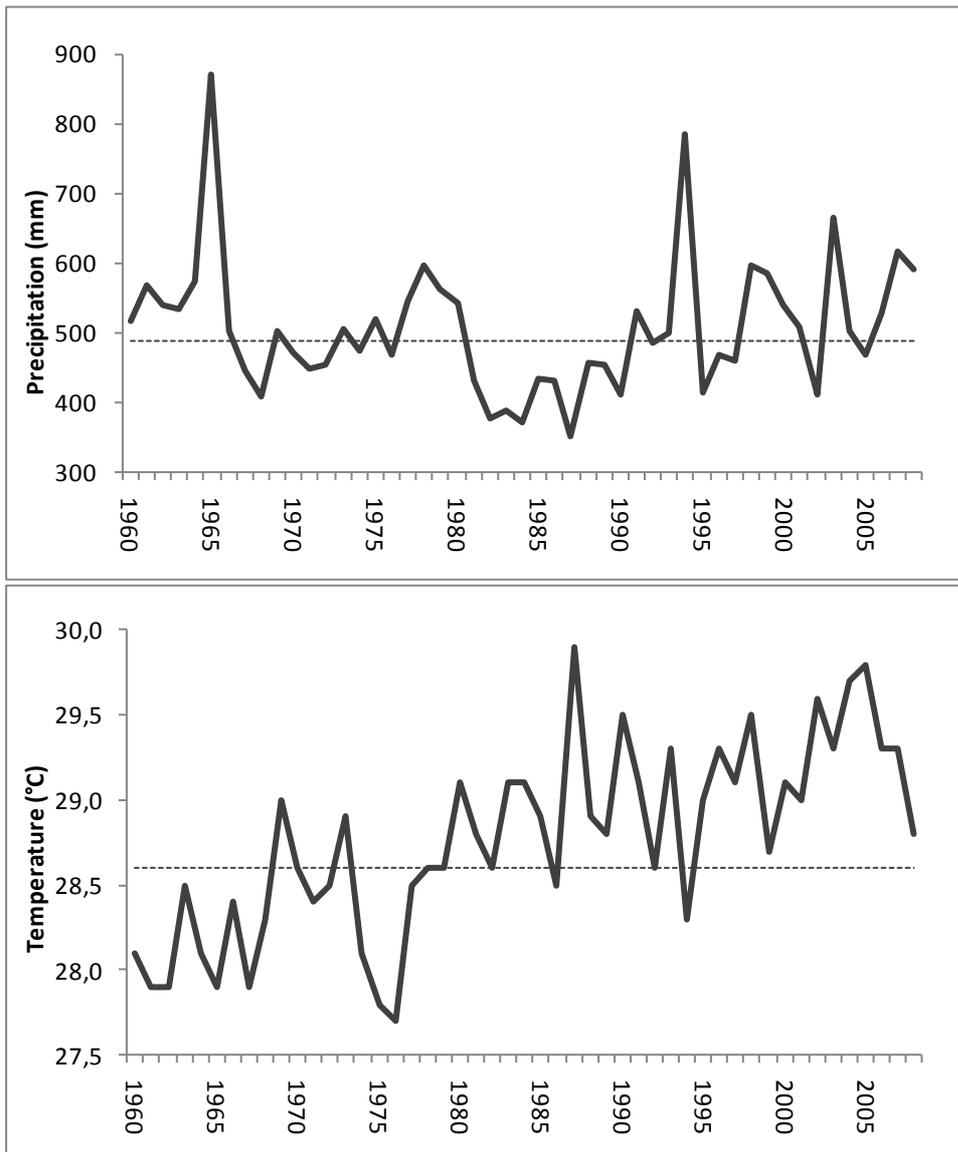
Figure 1. The Inland Delta of the Niger River in Mali

Figure 2. Niger River flow variability in Mopti, 1922–2006



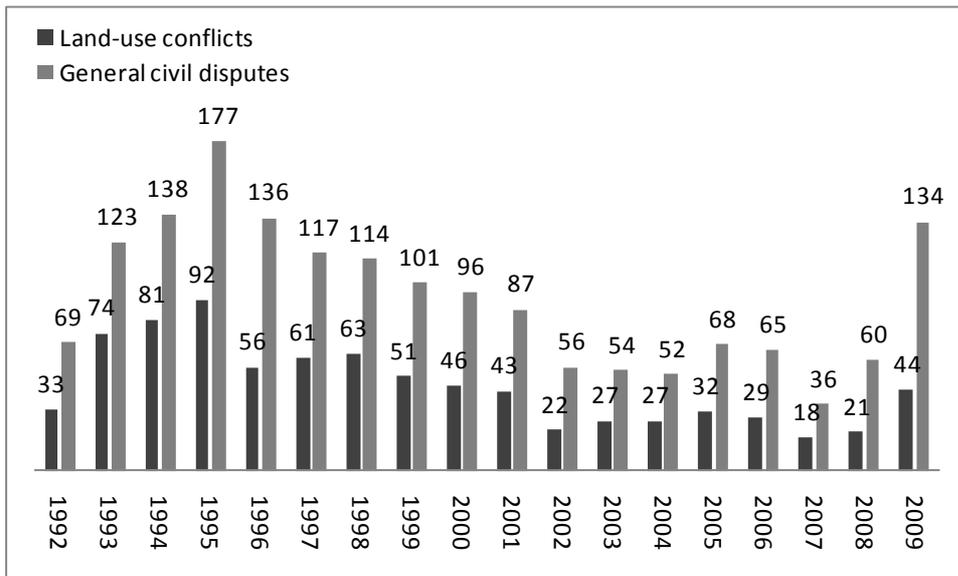
The graph shows maximum annual flood level of the Niger River in Mopti. Several years are missing in the early period. The dotted line represents the mean value for all years. Data derived from Direction Nationale de l'Hydraulique et de l'Energie in Bamako.

Figure 3. Climatological trends for Mopti, 1960–2008



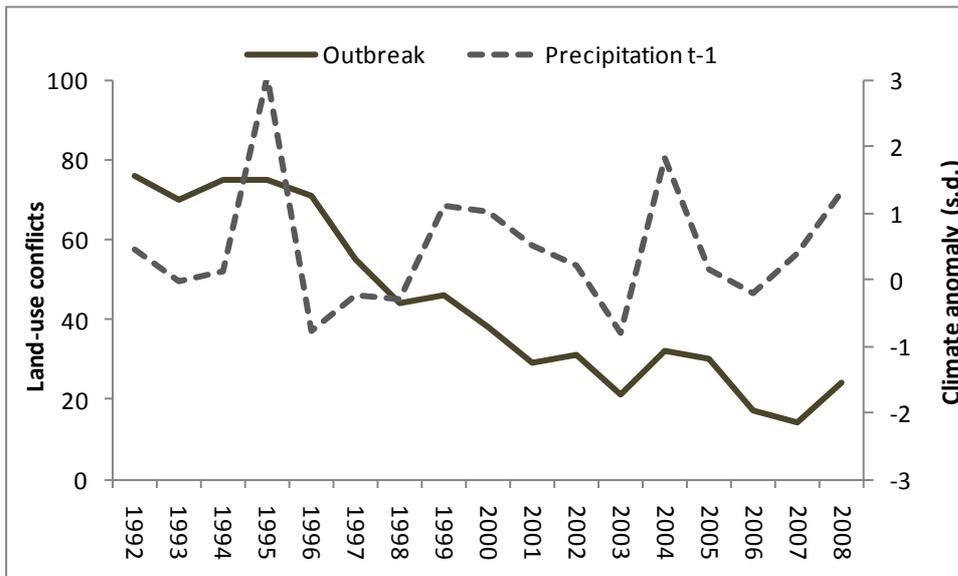
The figure shows total annual precipitation and mean annual temperature for the Mopti region with dotted lines representing the mean values for the 1961–90 period. Statistics derived from gridded climatological data from the University of Delaware.

Figure 4. Frequency of cases in the Sévaré Court of Appeal



The graph shows the number of disputes settled in the Sévaré Court of Appeal by category and year, according to the court's records.

Figure 5. Outbreak of land-use conflicts and rainfall variability in Mopti



The figure overlays statistics on the outbreak of land-use disputes that have appeared in the Sévaré Court of Appeal with data on climate anomaly in the Mopti region (one year time lag), defined as significant deviation from normal annual precipitation, 1961–90.

Figure 6. Resource map of the case study area

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