Chronic Communal Conflict and Environmental Pressures

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Abstract

This paper considers whether localized communal conflict is affected by increasing environmental instability. It follows from a long line of environmental research conclusions noting the likelihood of increased 'livelihood' or 'communal' conflict due to environmental scarcity or degradation. However local assessments of communal conflict often find the opposite is true- resource (rainfall) abundance is linked to increased conflict and scarcity to lower levels of conflict.

Many studies of civil war and environmental factors reiterate that the 'political and economic characteristics' of countries is the strongest indicator of civil war risk (see Raleigh and Urdal, 2007 for a review). Poor and underdeveloped states are likely to be more vulnerable to environmentally related violence (Baechler, 1999; Homer-Dixon, 1994 & 1999): Long-term environmental degradation (e.g. soil erosion etc) has a limited or no significant role in generating civil or international wars (see reviews by Theisen, 2008 and Salehyan, 2008; Homer-Dixon, 1991).

Our next 'frontier' is an investigation of the local level and how internal and external forces produce vulnerabilities and conflict risks. Although communal violence is posited to increase due to environmental variations and increasingly ecological uncertainly (Barnett, 2001; Raleigh and Urdal, 2007, Buhaug, Theisin, and Gleditsch, 2010), it remains a type of conflict that we know little about. This paper makes three main claims:

1. Climate changes do not occur randomly and the effects of climate changes are not equally felt. The 'political environment' is as important as the physical environment in shaping vulnerability to climate change.

2. Conflict research remains unclear about the patterns and processes of communal violence. In Arid and Semi Arid Lands (ASAL), it exhibits long term, possibly chronic, patterns.

3. The correlates to communal violence are likely to be predominantly local, as both the conflict parties and issues remain at this scale. Rainfall and other physical changes may influence conflict as higher rainfall is associated with higher levels of conflict, and lower rainfall is highly correlated with suppressed conflict patterns.

A Brief History of Local Environmental Security

The 'environmental security' discourse is entering its fourth 'generation'. The first three generations considered how degraded and depleted environmental factors generated increased conflict risk and instability within the developing world (Gleditsch, 1998). The

first generation contended that increasing population growth rates were going to exhaust natural resources. The second generation is characterized by Homer Dixon's interrogation of how resource scarcity, abundance and differential access within the developing world would result in large-scale violence and political instability. Homer Dixon and others present complex interactive flowcharts detailing the relationships between the physical environment and political change. However, these complex relationships defied quantification and ignored other conflict generating factors. The third generation largely focused on empirical models of conflict. Once quantified and considered in tandem with other conflict generating factors, it became evident that the previously promoted relationships assigning a position of primacy to environmental factors was largely incorrect. Several studies found a weak, if not insignificant, correlation between land degradation, water scarcity, and civil wars (Nordas and Gleditsch, 2007; Raleigh and Urdal; Buhaug et al, 2010). The conclusions of the third generation found that scarcity of either precious or renewable resources did not increase civil war risk.

Current State of Research

Only in the last few years have researchers debated how climate changes would affect political stability and conflict rates across the developing world. Climate change is expected to bring about significant changes in rainfall and temperature patterns in the long term, and increased frequency and intensity of disasters in the short term (30-50 years). Therefore, although physical changes are imminent, climate science remains unclear about the localized effects, the time scale, and what will occur within sub Saharan Africa (Williams, Kniveton, Layberry, 2008). This has reignited the discussion regarding the potential links between physical and political changes. Cross-national and sub national quantitative studies have again dismissed the connection between present physical changes and civil war and small scale qualitative and empirical studies have emphasized that a sub national political, economic and social vulnerabilities shape the risk and type of conflict risk well above the physical risks. Nonetheless, studies linking climate changes to conflict via rainfall or temperature variations continue, as evidenced by Miguel, Satyanath and Sergenti (2004) or Burke et al (2009). Many of these new 'security' studies rely on rainfall and temperature vacillations as their proxy for scarcity and ecological instability.

Rainfall shocks are a reliable indicator of climate change as precipitation changes are a direct form of short and long-term instability. Empirical studies linked precipitation and temperature to conflict tend to: 1) be cross national, although they address sub-national variations in both ecological and conflict conditions 2) rely on the assumed primary of ecological risk; 3) use simple temporal correlations to base their results and 4) mis-specify conflict types and overall correlates in high risk states[1].

[1] Burke et al's method is to examine the countries of sub-Saharan Africa over a relatively short period (1981-2002) and ask what was the average temperature during the calendar year, and were there 1,000 battle-related deaths in that year or not? By including major controls of a fixed country effect assuming that due to physical, social and colonial characteristics or other 'unchanging' factors, some countries have a uniformly higher or lower risk of conflict than others. They also include a linear-time effect, under the assumption that in each country some steady improvement or deterioration (due to increasing wealth or increasingly poor government) may be causing a steady, uniform rise or decline in their risk of violent conflict during this period (Goldstone, 2010). As Goldstone notes, to use such singular controls in a regression is incorrect as it implies any short term changes are not applicable to a study of quickly changing entities.

In this paper, we attempt to address the rainfall variation issue on the local scale and consider the likely increase in communal violence that is posited by several environmental security scholars. In effect, we are rescaling the question posed by others- if rainfall/climate change is to affect conflict, it should do so at the very local level, where rainfall shocks have detrimental effects of livelihood stability and asset attainment.

What underscores communal conflict?

Communal violence may become more common as the major adverse effects of direct climate change may be disproportionally felt amongst the smaller, economically and politically marginalized across ASAL states. How marginalization creates conflict risk across vulnerable groups is particular clear through an analysis of pastoral communities (a common livelihood type in ASAL).

Political and economic exclusion has relegated communities across ASAL to regulate increasingly degraded resource bases. The political vulnerability considers how limited access to public goods, humanitarian/adaptation/mitigation aid and government assistance and power has created a high-risk environment to shocks (ecological, economic or other) (Raleigh, 2010). Smith, Barrett and Box (2000:1949) note that at the national level, pastoralists represent a relatively powerless political minority viewed as backward by their government. There has been little state or colonial impact outside of administration in the pastoral areas. Missionaries and non-governmental organizations, especially in Kenya, have provided much of the public services, famine relief and livestock improvements. In general, the physical and institutional infrastructure is weaker in pastoral areas than in cropping zones and urban areas (Barrett, Little, Bailey, Chabari and Smith, 1998).

Given the lack of state administration in these areas, access to scarce or necessary resources strongly shapes local politics. Turner (2004:865-870) finds that in most poor rural communities, conflicts can be interpreted as resource related. "Conflicts over resources" are produced from a set of broader processes of change that vary within specific historical contexts. Given the importance of occupation in shaping ethnic identity in Africa, farmer-herder conflict is immersed within a broader identity politics. Further, struggles over resources are often only superficially so, as they in fact reflect broader social tensions (with ethical dimensions) between social groups but also tensions within these social groups.

Regulation of violent conflicts in areas marked by a weak state presence and challenged state legitimacy are the outcome of interactions between multiple social orders, actors, norms within a particular spatial setting. Unruh (2005: 225) indicates that marginalization and increased commodization in pastoral areas is leading to conflict as actors seek to mediate disputes through violence; and the degree to which governments are willing to support local authority and structures and customary institutions can depend on whether the government believes the situation to be beneficial to it. In short, local communal violence is common in pastoral areas because conflict regulates access to assets and resources in areas that authorities have either largely left to self-govern or are a present, yet hostile, force.

Communal Conflict

Our second point relates to the nature of communal conflict. Very few cross- group studies have been conducted on communal violence, yet the limited sample indicates that localized ethnic conflict differs in form, intensity, and frequency from other forms of

internal violence. Specifically, communal conflicts exhibit chronic patterns across traditionally hostile areas and sporadic patterns in other ASAL areas.

Communal conflict has largely avoided the definitional debates that have characterized civil war data projects (see Sambanis, 2004). We define communal conflict as a form of organized violence conducted between informal ethnic militias. Such conflict is primarily over 'local' issues and occurs between 'traditionally hostile' parties. It exhibits spatial and temporal trends which emphasize its roots in ethnic competition, resource assess and wealth acquisition.

Communal conflict differs across communities, but is a significant issue in the Sahel/East African region. Across these countries, organized violence is considered both traditional and 'normal' occurrence between of pastoralists/herders/farmers. Within those states and across these livelihoods, cattle raiding is the dominant form of organized violence. Cattle raiding is a distinct forms of conflict-- it is a group invasion or attack by an outside group with the main objective of stealing cattle rather than seeking territorial expansion (Mulugeta and Hagmann, 2008). Raiding livestock of one's traditional enemies is a means to expand rangelands, restock herds and improve social status. More recently, cattle raids in East Africa have become increasingly predatory in form, often implicating actors external to the pastoralist space such as businessman and warlords. Widespread availability of small weapons linked to the increase destitution among pastoralists as a result of raids Oba (1992) in M & H (2008). Overall, communal violence can take various forms, including pitched battles and attacks on civilians.

Patterns and Relationships to Environmental Scarcity

Previous researchers have noted that communal violence revolves around environmental and livelihood issues (livestock, grazing land, water access). But does conflict respond to resource scarcity or abundance?

Conflict rates across ASAL are spatially uneven and somewhat temporally fixed. The spatial distributions of risk measures are higher for those that border hostile neighbors where the loss of livestock in intertribal raids rose to 70% in particularly hostile areas (Smith et al, 2000: 1953). Differences are evident even in close areas, but can differ across states due to regime policies:

> "Although both northern Kenya and southern Ethiopia have been largely neglected by government and development agencies, discernable differences nonetheless appear. Food availability is much greater concern in Ethiopia, where marketing systems are less well developed and relief distribution has been widespread, especially as the Ethiopia Boran pastoralists have settled less than have Northern Kenya pastoralists…Water availability is a more prominent risk factor in Northern Kenya, where mean rainfall levels are significantly lower than counterpoint sites in Southern Ethiopia. Variations were evident in how groups of different wealth classes described their risks- conflict ranked as the most serious risk among the poor group and not at all amongst rich groups." (Smith et al, 2000: 1955).

Raiding behavior is strategically planned and tied to opportunities presented by the environment. "High vegetation represent high grass and dense bush cover which make it easier to track and ambush cattle with minimal risk of being caught (Meier et al 2007: 731). Herders have explained that the relationship of environmental shifts and conflict is more complex than previously assumed: "raiders like to attack during wet years because

of the high grass, strong animals, dense bush to hide and availability of surface water, which makes it easier to trek with the animals (Adano and Witsenberg, 2005: 723)". Cultural practices also dictate raid timing: Adano and Witsenberg (2005) note the persistence of revenge attacks, which correspond to the lunar cycle.

Meier at al (2007) conclude that the absence of a relationship between precipitation and conflict may indicate that rainfall is too indirect a measure- other physical attributes including livelihood types, land cover and surface water may indicate a stronger correlation to low level onset. But as importantly, they indicate the important, but largely ignored, aspect of regional practices. Development organizations working in pastoralist areas consistently note how attacks are designed to maximize surprise, celebrate significant events within warrior lives and limit the burden during drought years. During drought years, cattle raiding attacks decrease as additional burdens to pastoralist groups are avoided (Adano and Witsenberg, 2005). These findings concur with Turner's (2004:877) analysis that the high variability in the productive resources leads to strong variation in the competition over such resources and relatedly, conflicts resemble strategic contests over the long term to preserve or gain access.

Questions that shape our study

We ask what are the potential effects of environmental shifts on communal conflict. Specifically, we address whether:

1) Areas have overall differences in conflict event occurrence, normalized by area, population and over time?

2) Does communal violence patterns exhibit unique spatial and temporal tendencies that are different from political ethnic violence or civil war?

3) Are patterns of violence correlated to environmental shifts, such as rainfall spatial and temporal variation?

Conflict in Kenya

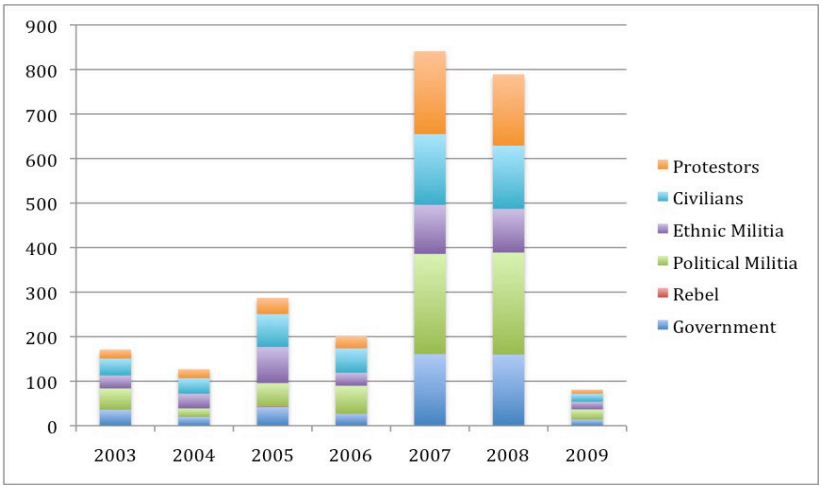
Kenya is chosen as the sample case because it exhibits several types of low-level violence with variations over time (i.e. electoral/political violence, communal violence and riot/protesting) (see figure 1). Northern Kenya is considered a 'chronically conflicted area' due to the high rate of violent interaction between ethnic communities (See map 1 & 2). However, researchers have indicted variations in conflict across Northern Kenya and across groups residing within the northern zones. Finally, Kenya has significant variations in potential conflict generating factors, including poverty, population density and rainfall patterns.

Conflict Patterns

Conflict data for Kenya are derived from the Armed Conflict Location and Event Dataset (ACLED), which collects information on violent political struggles across fifty states from 1997-2010. Data on Kenya include a range of actors involved in election violence, ethnic 'communal' violence, violence against civilians, riots and protests. Kenya event count for 2003-2010 is 1888 and it is one of the most active states across sub-Saharan Africa. Although Kenya is not usually considered a 'conflicted state', it has one of the highest event counts in ACLED for the period of 2003-2009. This is mainly due to the high rate of violence in late 2007-early 2008 and also due to high rates of riots, protests, and local level violence in Kenya.

Sharp increases in 2007 and 2008 are followed by a quieter year in 2009 (coded to summer 2009). Kenya has a similar proportion of violence against civilians, riots/protests and battles throughout this time period. Kenya has little to no "rebel activity" but a plethora of both communal and ethnic militias who regularly engage in disputes. Although it is speculated that these events occur in distinct areas of the state, during the rise in violence of 2007-2008, communal/ethnic violence also rose, indicating that violence of one type may beget higher rates of other types of violence in different areas.

Figure 1: Kenya Conflict Events by Actors 2003-2009



In separate years:

2003: 21 groups, including 9 ethnic militias (including unidentified militias from Kenya, Ethiopia, and Uganda) are active in the state. Unidentified armed groups from 4 countries (Kenya, Ethiopia, Yemen and Sudan) were also present.

2004: 34 groups of which 13 are ethnic militias and 1 religious (Muslim) militia. A large number of distinct civilian attacks directed towards particular ethnic communities (in Kenya and near abroad) are the main reason for the inflation in actor numbers.

2005: 42 groups recorded, with a substantial rise in ethnic militias (18), targeted civilian communities, foreign militaries and ethnic militias. The Banana and Orange political militias are also present.

2006: A decrease to 27 groups, 10 of which are ethnic militias and others (including Mungiki and the Taliban gang) recorded as 'political militias'. Fewer foreign groups are noted this year.

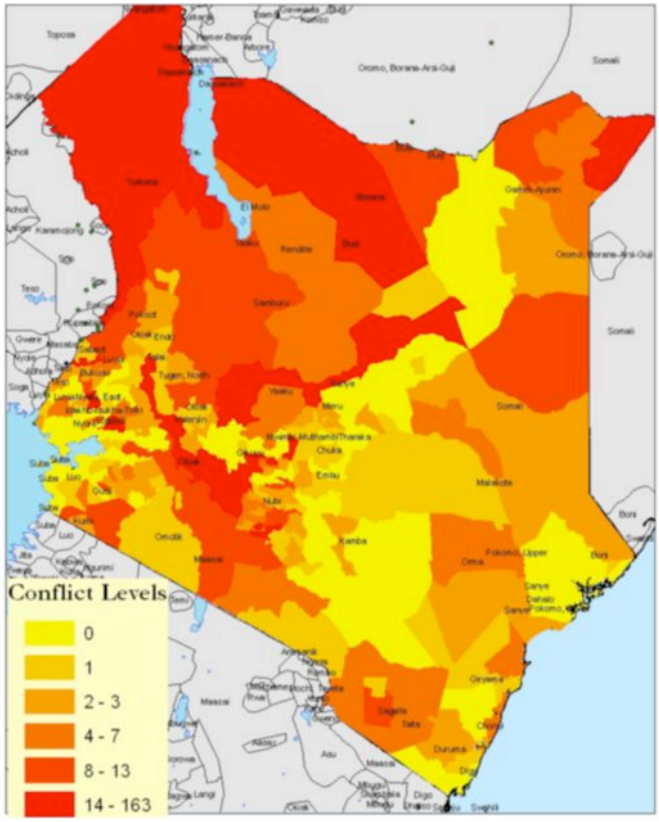
2007: 56 groups, which a drastic increase in small local groups (i.e. Mombasa Republican Council), a sharp increase in the number of ethnic militias and attacked ethnic groups (20 ethnic militias), and a rise in political militias. Incursions from Somalia and Sudan also noted.

2008: 47 groups, dominated by 17 ethnic militias and a string of political militias belong to the 'Orange support group' or "Political revenge movement". A high number of targeted attacks on civilians/ethnic communities are recorded.

2009: 19 groups of which 6 are ethnic militias who consistently appear. The remainders are a scattering of Kenya and Ugandan Military units, civilian groups, rioters and protestors.

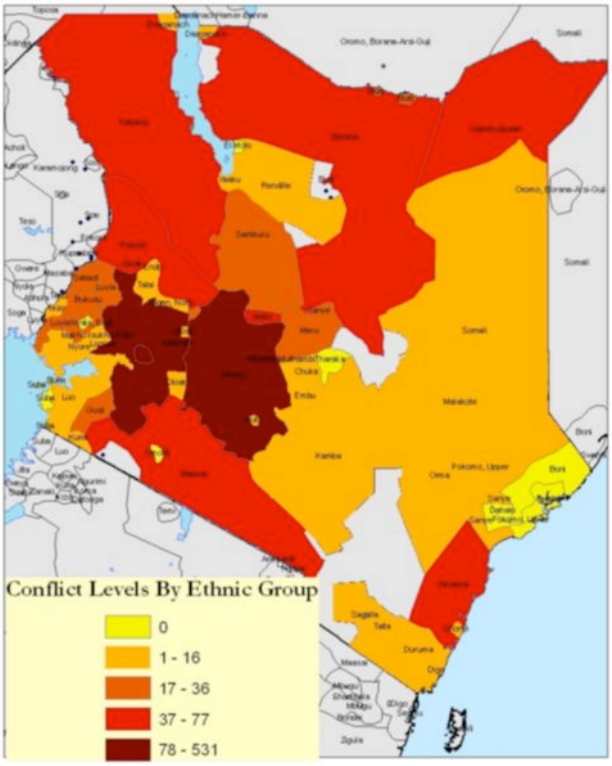
There are significant differences across Kenya regarding violence patterns. Map 1 is a basic map of Kenyan conflict (at adm 2 level).

Map 1: Kenyan Conflict Distribution



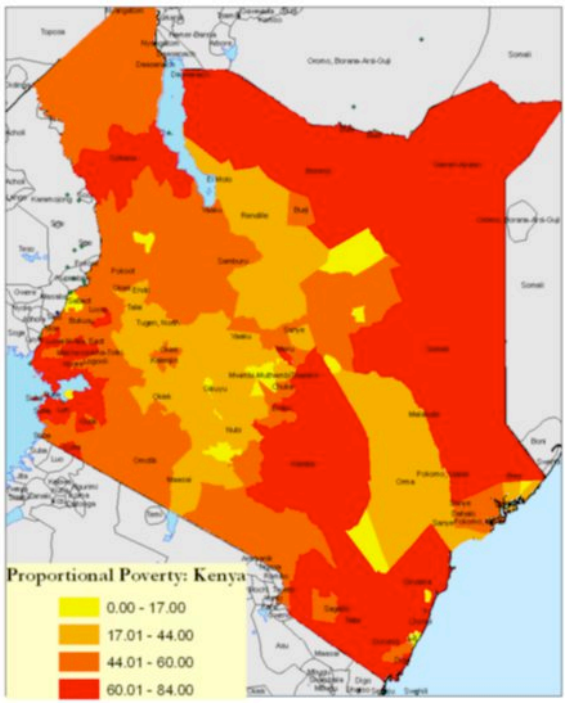
Map 2 is an analysis of conflict by ethnic group. Here we see that conflict is actually clustered in the Rift Valley and the pastoral areas. As mentioned above, there is some speculation regarding whether 'traditional' and chronic conflict is found on the spatial cusps of ethnic communities. Using a 20km buffer around the border of ethnic homelands, we find that 980 of 1400 total conflicts are found within these buffers (70%). When we remove elections and rioting – to correct for temporal surges and mainly urban movements) we find that 408 of 718 total (57%) of conflicts in rural areas are found in or around the designated homeland of distinct ethnic communities (even though in total area, these buffers represent a small portion of the state). We have mild support for our notion of spatial cusps and conflict events.

Map 2: Conflict By Ethnic Group



Map 3 looks at the distribution of poverty in Kenya, as we have argued that pastoral areas are the most poor. However, in proportion of poor people within districts, the Eastern areas is clearly more poverty stricken, as in the 'Somali' areas, over 60% of the population are destitute.

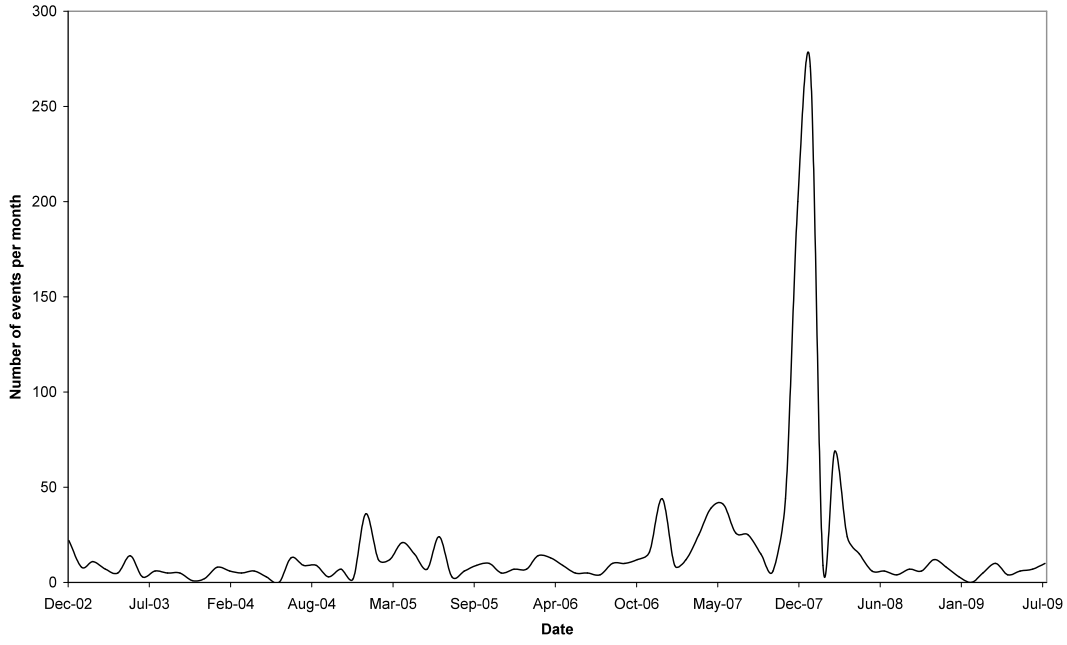
Map 3: Kenyan Poverty



Results

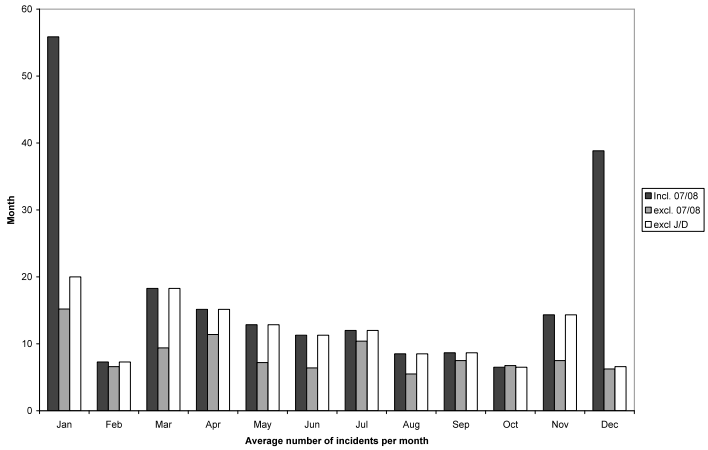
We did some basic means testing and composite analysis to determine the temporal trends between rainfall and conflict in Kenya from 2003-2009. One considerable issue was the sharp spike in violence that occurred around the time of the recent elections in Dec 2007. In several of the models below, we removed the election spike (see in Figure 2) and re-ran analysis. The results remained largely the same- periods of high rainfall are correlated with periods of high conflict, and periods of low rainfall are associated with lower levels of conflict, comparatively.

Figure 2: Time series of total number of incidences per month- Jan03 to July 09



When the full sample is run without any changes we find no statistical significance between rainfall in months with high number of incidents verses months with low numbers of incidences. Where populations compared were top 25% months with high or low incidences and rainfall compared on monthly, 3, 6 and 12 monthly antecedent conditions and 3 months in advance. Obviously the 2007 Election skews the data. Two removals attempted of election period – one from March 07-March 08 -called excl. 07/08 and by removing just Dec 07 and Jan 08 – called excl. J/D

Figure 3: Histogram of Monthly Distribution of Incidences for 3 samples



For the sample dataset Excl 07/08: The monthly, 3 monthly prior but including the month in question and three months post including the month in question rainfall is statistically significant higher for months of high civil violence compared to low (99% for one tailed and 98.5% for two tailed for monthly and 99.5% for one tailed and 99% for two tailed tests for 3 month antecedent rainfall and 99.9% for one tailed and 99.8% for two tailed tests for 3 month post event rainfall) No significance found for 6 and 12 month antecedent conditions nor for three months prior to incidences (see Tables) 1-3.

Table 1: Monthly Prior T test

t-Test: Two-Sample Assuming Unequal Variances for monthly

	Variable 1	*Variable 2*	
Mean	14.80406	22.24181	
Variance	34.35566	101.3023	
Observations	16	17	
Hypothesized Mean Difference	0		
df	26		
t Stat	-2.61236		
P(T<=t) one-tail	0.007372		Sign.=0.992628
t Critical one-tail	1.705618		
P(T<=t) two-tail	0.014744		Sign. 0.985256
t Critical two-tail	2.055529		

Table 2: 3 Month Prior T-test

t-Test: Two-Sample Assuming Unequal Variances

for 3 months including month of conflict

	Variable 1	*Variable 2*	
Mean	15.1805	20.76526	
Variance	24.6756	44.08839	
Observations	16	17	
Hypothesized Mean Difference	0		
df	30		
t Stat	-2.7462		
P(T<=t) one-tail	0.005046		Sign=0.994954
t Critical one-tail	1.697261		
P(T<=t) two-tail	0.010093		Sign= 0.989907
t Critical two-tail	2.042272		

Table 3: 3 Month Including Month of Conflict

t-Test: Two-Sample Assuming Unequal Variances

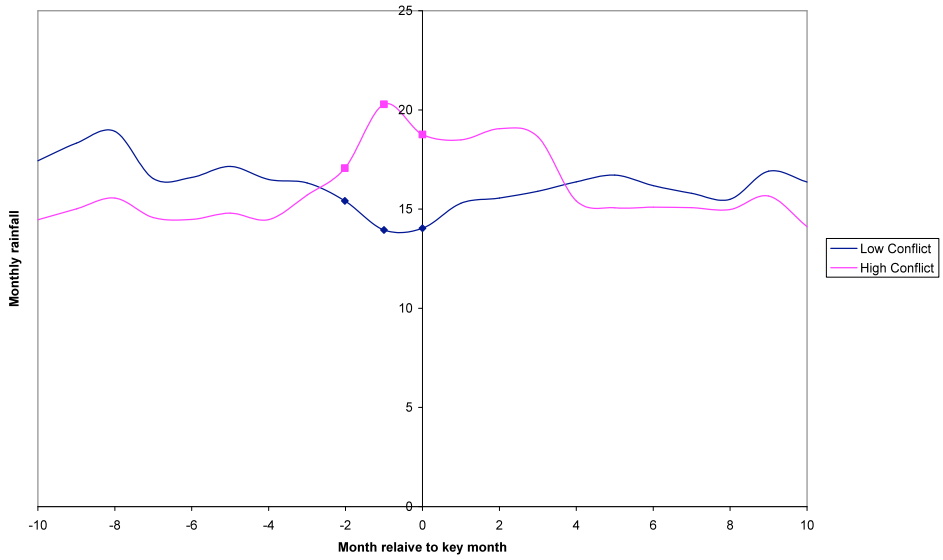
For three months post month and including month

	Variable 1	*Variable 2*	
Mean	41.51521	62.97462	
Variance	107.3223	500.1759	
Observations	16	17	
Hypothesized Mean Difference	0		
df	23		
t Stat	-3.57014		
P(T<=t) one-tail	0.000812		Sign.=0.999188
t Critical one-tail	1.713872		
P(T<=t) two-tail	0.001625		Sign.=0.998375
t Critical two-tail	2.068658		

For the sample dataset Excl J/D, the 3 monthly rainfall is statistically significant higher during months of high civil violence compared to low (96% for one tailed tests for 3 month rainfall). So, essentially taking out any part of the election data returns the same results. No significance found for monthly, 6 and 12-month antecedent conditions nor for three months prior to incidences (i.e. true antecedent) nor three months in advance including month.

Even with attempts to remove "seasonality" from the sample returned the same relationships across high rainfall and conflict. We also removed Nairobi from the sample (to capture purely ethnic 'communal' conflict) and we also removed riots (which were largely removed when Nairobi was censored). The results from the subsequent models were largely the same, but as figures 4 and 5 show, the relationship between high rainfall/high conflict and low rainfall/low conflict is very apparent and clear.

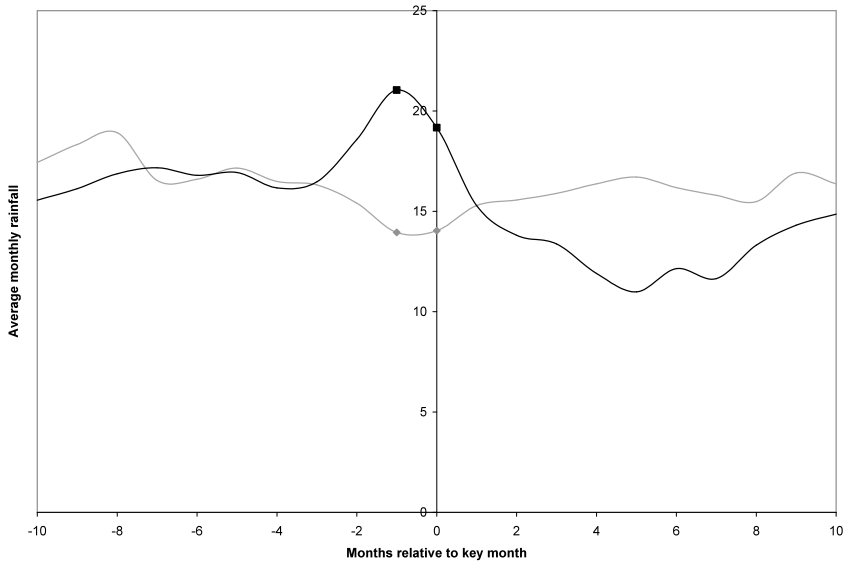
Figure 4: Relationship between Rainfall/Conflict (No Nairobi, No Riots)



The high conflict curve (pink) is based on twenty months with the highest number of incidents and the twenty months of lowest conflict counts for the low conflict (blue) curve. The diamonds and squares indicate where there is an over 95% significant difference between the high and low conflict samples of rainfall. Figure 4 clearly shows that an increase in rainfall up to two months prior to conflicts is statistically higher for months when there is a lot of conflict compared to when there is only a little.

Figure 5 is similar but only excluding Dec 07 and Jan 08. Significance in this figure is limited to month previous and month of occurrence where the black line represents high conflict months and the grey line is for low conflict months.

Figure 5: Relationship between Rainfall/Conflict (No Nairobi, No Riots) by Month



Conclusions and Further Research

Our conclusions are not conclusive just because we have found a definitive relationship between high rainfall patterns and conflict. Indeed, we intend to expand our study to determine whether these patterns are evident in Southern Ethiopia and Eastern Uganda- both areas considered 'chronically conflicted'. Our results do contradict the large N studies of environmental security, but to be fair every localized study contradicts the findings from such studies, and common sense will tell a reader that the conclusions of those studies are a function of empirical models and not a deep understanding of the changing environment.

If we are correct and communal violence responds positively to increased rainfall and resource abundance, then the 'greening of the Sahara' may create serious security issues within ASAL states. But, in the short term, it is more likely that we will find market prices are also strongly related to conflict in non-chronic areas where disputes may be closely linked to market mechanisms. If so, that will lead us to speculate further on the types and patterns of communal based local violence.

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