Oil Extraction And The Changing Dynamics Of Pastoral Conflicts: A Conjoint Experiment In Turkana, Kenya

By: **Hye-Sung Kim**

Abstract

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*Oil extraction and the changing dynamics of pastoral conflicts: a conjoint experiment in Turkana, Kenya**

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A B S T R A C T

Communities inhabiting the arid and semi-arid areas of eastern Africa have long suffered from and engaged in pastoral conflicts. However, since some countries in the region became oil producers, the conditions affecting pastoral conflicts have changed. This study examines how oil extraction may influence pastoral conflicts by using a survey experiment conducted in Turkana County, Kenya, on a sample of 801 respondents. The study finds that overall, respondents' perceived risks of pastoral conflicts decrease when they are primed about the consequences of oil extraction leading to fundamental changes in pastoral livelihoods, such as an increase in employment opportunities in the oil sector and rapid social changes. The residents of Turkana view pastoral conflicts as customary as long as pastoralism continues and fundamental changes to pastoralism-based livelihoods originating from oil discovery and extraction may lead to a decrease in the pastoralist population engaging in pastoral conflicts.

Keywords – Oil Extraction, Pastoral Conflict, Experiment, Kenya, Turkana.

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INTRODUCTION

Pastoral conflicts that cross national or sub-national boundaries in northeast African countries, namely, Ethiopia, Kenya, Uganda and South Sudan, are not new. This region is characterised by semi-arid land frequently prone to droughts, poverty and pastoralism exercised by ethnic groups of pastoral farmers (Mkutu & Mdee 2020). Violent conflicts amongst pastoralist groups in the form of cattle and livestock raiding have long existed and go back to pre-colonial periods (Bollig 1990). However, since countries in this region became oil producers, the conditions affecting the conflict dynamics in the area have changed. Oil extraction has brought both positive consequences such as job creation and economic development and negative consequences such as climate change, environmental degradation and displacements (Johannes *et al.* 2015; Schilling *et al.* 2015, 2018; Agade 2017). These consequences can increase the risks of pastoral conflicts by intensifying the competition over scarce resources and new economic opportunities, promoting a sense of inequality between pastoral communities, and leading to cycles of retaliatory conflict. They can also decrease the conflict risks by leading people to leave pastoralism for other opportunities. Yet few quantitative studies have identified the causal relationships between each of these consequences of oil extraction and the conflict dynamics among pastoral communities in this region.

To fill this gap, this study aims to identify the causal relationships between oil extraction and pastoral conflicts and test which causal mechanisms best explain the relationship between oil extraction and pastoral conflicts among five explanations, namely, *the competition over limited resources hypothesis*, *the opportunism hypothesis*, *the inequality hypothesis*, *the retaliation hypothesis* and *the change in the pastoralist population hypothesis*. The competition over limited resources hypothesis predicts that oil extraction exacerbates already imited resources such as grazing area and water, intensifying the need to fight over such resources. The opportunism hypothesis predicts that oil extraction's positive economic benefits including oil revenues and economic development will increase the risk of conflict as competition intensifies with neighbouring communities over territory where oil wells are located. The inequality hypothesis predicts that the sense that benefits have been distributed unequally generates feelings of grievance among those who benefitted less, leading to conflicts in an attempt to balance inequalities. The change in the pastoralist population hypothesis predicts that as the oil industry creates new job and business opportunities, those who engage in pastoralism and pastoral conflicts may leave pastoralism and potentially pastoral conflicts for new employment and business opportunities, thus decreasing the frequency of pastoral conflicts. To this end, this study uses a conjoint experiment to identify the relative causal effects of multiple and inter-connected components of oil extraction on the respondents' perceived risks of pastoral conflicts.

The conjoint experiment was embedded in an opinion survey administered at the individual level on a sample of 801 residents of Turkana County, Kenya, one of the most marginalised and impoverished counties in Kenya (Mkutu & Mdee 2020). In Turkana County, the primary industry has traditionally been pastoralism, and pastoral conflicts with other pastoralist ethnic communities involving cattle and livestock raiding across sub-national or country borders have been the main type of conflict in this region. However, a commercially viable amount of oil was discovered in 2012 by Tullow PLC, and oil extraction began shortly thereafter, which changed the conflict dynamics in the area by leading to new types of conflict such as violence toward the oil company in the form of riots, demonstrations and roadblocks near oil sites and by potentially fuelling long-standing conflicts between the people of Turkana and rival pastoral ethnic groups, particularly the Pokot (Johannes *et al.* 2015; Shilling *et al.* 2015, 2018; Agade 2017). Focusing on the conflict between the people of Turkana and the Pokot, this study presents experimental evidence suggesting that the *change in the pastoralist population hypothesis* best explains the Turkana residents' perceived risks of pastoral conflicts, followed by the *competition over limited resources hypothesis.*

CAUSAL MECHANISMS OF THE RELATIONSHIP BETWEEN OIL EXTRACTION AND PASTORAL CONFLICTS

The extant literature, comprising largely qualitative research, has examined the causes of a long history of pastoral conflicts (Bollig 1990; Johannes *et al.* 2015; Shilling *et al.* 2015, 2018; Agade 2017). I categorise them into five causal mechanisms and discuss how each can be applied to explaining the relationship between oil extraction and pastoral conflicts.

The competition over limited resources hypothesis

One of the well-known causes of pastoral conflict is drought: studies find that pastoral conflicts become more frequent after droughts because the competition over scarce water and pasture intensifies (Dietz 1987; Mobjörk 2017). These findings are consistent with the broader conflict literature that finds that the depletion and scarcity of natural resources result in social unrest and possibly violent conflicts between ethnic groups (Percival & Homer-Dixon 1998; Homer-Dixon 1999; Brunnschweiler & Bulte 2009).

Some research, however, finds contrasting results and argues that conflicts occur more frequently in the rainy season compared with the dry season. For example, Adano *et al.* (2012) analyse the longitudinal rainfall data collected in the Marsabit District of Kenya and find that pastoral conflicts in the district were more frequent in years with high rainfall when resources such as water and pasture were plentiful, while violent conflicts were no more likely in years of droughts. Meier *et al.* (2007), however, show that although they find more occurrences of violent activities during the rainy season in the Karamoja

cluster, the pastoral region in the Horn of Africa bordering Uganda, Kenya and Ethiopia, the rainy season is not necessarily associated with abundant resources. They found that a rainy season with the highest precipitation is when the forage availability is lowest and pastoralists move to search for better access to water and pasture. Their findings, therefore, support the view that resource scarcity increases pastoral conflicts (Meier *et al.* 2007).

One of the negative consequences of oil extraction is environmental degradation, which can lead to damage to biodiversity, increased air and water pollution, and negative impacts on human and animal health from polluted water and resources (Mkutu *et al.* 2019; Kim & Mkutu 2021). Some of these consequences directly impose pressures on already scarce resources that are essential for pastoralism, such as water, pasture, vegetation, cattle and livestock, and such constraints can increase tensions between pastoral communities by intensifying the competition over these resources. Therefore, if oil extraction leads to increased conflicts between pastoral communities due to competition over scarce resources, the following causal mechanism can be summarised as follows:

Oil extraction → Environmental degradation damaging livelihoods and essential resources for pastoralists → Increase in competition over limited resources among pastoralists → Increase in tension and conflict between pastoral ethnic-groups.

Opportunism hypotheses

Individuals' strong desire to accumulate wealth through raiding and looting has also been viewed as a motivation for pastoral conflicts. Traditionally, when there is a need to accumulate cattle and livestock to meet social exchanges such as an increase in bride prices given with cattle and livestock, Pokot raiders tend to organise raids against the Turkana (Bollig 1990). The distribution of cattle and livestock earned from raiding is then made according to a raider's status, contribution to the raiding and whether the raider owns a gun or not. Owning guns and weapons gives raiders a clear advantage in accumulating more wealth and thus contributes to intensified pastoral conflicts in the region through small arms and weapons proliferation (Bollig 1990; Mkutu 2007; Eaton 2010). Several studies document how the commercialisation of livestock raiding (Mkutu 2007; Eaton 2010; Stites & Howe 2019) intensified pastoral conflicts by promoting individuals' motivation to accumulate wealth. In addition, Okumu *et al.* (2017) find that elites interested in economic gains mobilised commercialised raiding, making the existing ethnic cleavages salient. Okumu *et al.* (2017) also expected that the discovery of oil is likely to exacerbate cross-ethnic conflict because competition for oil wealth among elites is likely to increase. I refer to this as 'the opportunism hypothesis' which states that it is new and valuable economic opportunities and resources, rather than their scarcity, that increase competition over access.

In the case of pastoral conflicts in the Horn of Africa, the opportunism hypothesis is linked to disputes over territory or borders, which would

determine to whom valuable resources such as oil and major economic development opportunities should be allocated. Agade (2017) demonstrated that in Kenya the location of the Turkwell dam has intensified the border dispute between Turkana and West Pokot counties, and the conflicts between the two groups escalated severely in 2014 and 2015. In addition, Schilling *et al.* (2018) document evidence of the ongoing border dispute over the Turkana-West Pokot border in Kenya and Pokot's attempt to occupy the part of Turkana South where oil was found. In this case, the existing ethnic militia who are typically involved in pastoral conflict through raiding can be organised to obtain better access to oil. If opportunism can change the dynamics of pastoral conflicts between pastoral ethnic groups, it can be expected that increase in oil, economic opportunities and benefits generated by oil extraction would accelerate competition over the territory where major oil wells are located, which can be summarised by the following causal mechanism:

Oil extraction → Oil revenues and other development opportunities → Increased competition over access to oil wells with neighbouring pastoral ethnic groups → Territorial disputes over administrative boundaries → Increase in the conflict risk between pastoral ethnic groups.

Inequality hypothesis

Studies find that socioeconomic inequality between ethnic groups is linked to ethnic conflicts (Cederman *et al.* 2013; Fjelde & Østby 2014). Although most of these studies used aggregate-level data, Rustad (2016) used individual-level survey data to find evidence that horizontal inequalities lead to conflicts. Studies find that horizontal inequalities between groups motivate conflicts when these inequalities are linked to oil production (Langer & Ukiwo 2011). Rustad (2016) found that in oil-producing regions, the relatively deprived group is more likely to initiate conflicts, while it is generally the relatively privileged group that initiates the conflict when horizontal inequalities are not tied to oil production. Drawing from this literature, I refer to this causal mechanism as 'the inequality hypothesis', which can be summarised by the following causal mechanism:

Oil extraction → Increase in business and economic opportunities and oil revenues in the community that discovered oil → Increase in the sense of horizontal inequality between the ethnic group in oil-producing region and neighbouring ethnic groups → Increase in risk of conflict among the rival pastoral communities.

Retaliation hypothesis

Studies have also recognised the role of feelings of grievance (Schilling *et al.* 2015, 2018; Agade 2017) and wanting to retaliate (Eaton 2008) as a driver of pastoral conflicts. Bollig (1990) memorably describes how the emotion of rage and resentment can lead to pastoral conflicts based on his in-depth case study of Pokot

between 1969 and 1984. Cattle and livestock raids are carried out in a highly organised manner by the community members of Pokot, with multiple cultural practices held before the actual raid, including a proposal of a raid by men known for their fierceness and bravery, approval and blessing by prophets, spying on the enemy, training and mobilisation of raiders (Bollig 1990).

Bollig (1990: 80–2) describes the rage and resentment felt by ferocious men and their expression of these emotions as though they are a necessary condition for highly organised violence and raids, given that the expression of rage should precede the cultural ceremony and the community's approval of organised raiding. The study further notes that such emotions can arise due to mistreatment and exploitation (Bollig 1990: 81) and that a raid can provoke future raids (Bollig 1990: 74). That is, the experience of mistreatment or exploitation by the out-group and loss of their community members' lives and livestock due to violent attacks by the out-group can produce strong emotions of anger, rage and resentment that lead to violent attacks targeting the rival ethnic group, which likely fuel counterattacks. Bollig (1990) uses a case study of Pokot to detail the process through which the feeling of rage and resentment leads to an organised raid; however, others also recognise the cultural and community aspect of organised raiding and pastoral conflicts (Adano *et al.* 2012; Agade 2017) and the importance of feelings of grievance (Schilling *et al.* 2015, 2018; Agade 2017) and wanting to retaliate (Eaton 2008) in pastoral conflicts. Stites & Howe (2019) also agree that large-scale organised cattle raiding intensified until the 1980s and 1990s in the Karamoja area, and taking revenge was an important motivation during this time until raiding became commercialised for economic gain at the individual level. I refer to this as 'the retaliation hypothesis'.

Oil extraction → […] → Onset of conflict initiated by adjacent, rival ethnic groups → Increased sense of grievance against the perpetrator community → Increased risk of pastoral conflicts due to retaliation,

where […] refers to any other causal mechanism for pastoral conflicts resulting from oil extraction.

Change in the pastoralist population hypothesis

Political violence literature has examined the relationship between youth population bulges and violent conflicts (Goldstone 1991; Collier & Hoeffler 2004; Urdal & Hoelscher 2012). One of the well-known arguments explaining this relationship is the opportunity cost hypothesis (Collier & Hoeffler 2004) which predicts that in conflict-prone, economically deprived societies, employment opportunities for the young male population are rare and so the opportunity costs for their participation in violent activities are low, leading them to participate in conflict activities. While the conflict literature discusses the importance of male youth in pastoral conflicts (Bollig 1990), few studies have explicitly discussed how the new employment and business opportunities in the oil sector due to oil discovery and extraction can result in a decrease in

the pastoralist population including the male youth as people leave pastoralism for more economically beneficial opportunities. I refer to this as 'the change in the pastoralist population hypothesis'.

Oil extraction → Employment and business opportunities in the oil sector → Increase in the opportunity costs of engaging in pastoralism → Increase in transition from pastoralism to the oil sector and the new opportunities among the pastoralist population including the male youth → Decrease in the frequency and risks of pastoral conflicts.

OIL EXTRACTION AND PASTORAL CONFLICTS IN TURKANA COUNTY

The majority population in Turkana County, Kenya, is the Turkana people, most of whom are pastoralists. Turkana County is one of the most politically and economically marginalised counties in Kenya, which is attributable to multiple factors (Mkutu & Mdee 2020). First, Turkana County's land is semi-arid and hence their pastoralism has been affected by droughts and other types of natural disasters. Second, pastoral conflicts involving cattle and livestock raiding have long existed between the people of Turkana and other pastoral ethnic groups living nearby, among which conflicts between the Turkana and the Pokot from the neighbouring West Pokot County have been the most frequent (Mkutu 2014; Mkutu & Mdee 2020). Until recently, the need for security protection in the area has not been sufficiently met by the central government, which led some to refer to Turkana as 'ungoverned space' (Mkutu 2014), increasing distrust among the people of Turkana in their government's capacity and willingness to protect them from conflict (Shanguhyia 2021).

Since Tullow discovered oil in Turkana in 2012 and started oil extraction shortly afterward, the conflict dynamics in the area have changed significantly. First, it has led the community of Turkana to engage in new types of conflicts that did not exist before, namely, conflicts with oil companies resulting from unmet expectations (Johannes *et al.* 2015; Schilling *et al.* 2015, 2018; Agade 2017) and inter-clan tensions among the people of Turkana (Agade 2017). Second, oil extraction's negative impacts on the natural environment and resource constraints may have exacerbated existing conflicts between Turkana and Pokot. The extraction and use of fossil fuels drives climate change, which damages essential resources for pastoralism such as water, fish, soil and grazing areas. Several studies find that climate change and subsequent damage to the natural environment are linked to the intensification of existing conflicts between the Turkana and Pokot (Omolo 2010; Schilling *et al.* 2012; Ide *et al.* 2014; Scheffran *et al.* 2014; Johannes *et al.* 2015). The process of oil exploration also uses large quantities of groundwater essential for pastoralists and leads to the loss or interference with land, pasture, livestock and migration routes. These constraints on the natural environment, resources (Schilling *et al.* 2015) and land (Johannes *et al.* 2015) lead to increased competition over resources.

Several studies report the environmental degradation that has caused further constraints due to oil extraction in Turkana County. Shilling *et al.* (2015, 2018)

find that oil extraction in Turkana was linked to environmental degradation, water and soil pollution, and limited access to water and land due to the large quantities being used for oil extraction. In addition to reporting similar negative environmental consequences of oil extraction, Agade (2017) also documents the displacement of local people, a loss of access to land that was purposed for oil operations, and a loss of settlements where pastoralists stay during the dry season or during droughts. Pastoralists in Turkana fish in Lake Turkana during droughts and other crises, but the lake was polluted due to oil extraction and the severe level of vibration during drilling killed off many of the fish (Agade 2017). These studies document the damage to essential resources for pastoralism, with the perceived insufficient compensation for this damage being a source of grievance among the Turkana, resulting in riots, demonstrations and roadblocks directed toward oil companies (Schilling *et al.* 2015, 2018; Agade 2017).

The economic impacts of oil extraction in Turkana County have also been well-documented by several studies, which include positive impacts such as (a) the creation of jobs and new business opportunities and (b) oil companies' provision of local public goods such as boreholes, schools and roads. There are also unintended negative consequences such as the resentment among the Turkana people due to layoffs by oil companies and perceived inequality in the distribution of jobs, business opportunities and revenues from oil extraction (Johannes *et al.* 2015; Agade 2017; Schilling *et al.* 2015, 2018; Mkutu & Mdee 2020). The resentment created from perceived inequalities has generated tensions between the people of Turkana and oil companies and also between the people of Turkana and other pastoral ethnic groups. For example, community members express grievances toward Tullow PLC for employing people outside of Turkana, especially for skilled jobs, laying off employees who are from Turkana, and offering little to no compensation for the death of livestock and other losses during oil operations. These and other grievances contributed to riots, demonstrations and building roadblocks against the oil companies (Agade 2017; Schilling *et al.* 2015, 2018).

RESEARCH DESIGN

To examine the causal mechanisms that lead oil extraction in Turkana to violent conflicts between pastoral ethnic groups, a conjoint experiment (Hainmueller *et al.* 2014) embedded in a larger opinion survey was conducted. A conjoint experiment allows identification of relative causal effects of multiple, potentially inter-connected attributes, by randomly varying the value of each attribute simultaneously. In practice, it is not possible to randomly vary potential causes of conflicts. However, if an informational vignette is used in a survey experiment, the type of information that is primed for can be randomly varied. Therefore, a conjoint experiment is conducted through a survey experiment using an informational vignette that contains a script consisting of experimental conditions.

In this conjoint experiment, the positive and negative consequences of oil extraction that are randomly presented to the respondents draw from existing studies introduced in the previous section. For a more detailed explanation of the experimental design, see the companion article (Kim & Mkutu 2021). Various consequences are grouped into seven attributes, namely, *job creation*; *local public goods provision* by oil companies in the form of corporate social responsibility or infrastructure building; *new economic and business opportunities*; *limited access to resources essential for pastoralism*; *consequences of environmental degradation*; *social changes* due to a rapid influx of population from outside Turkana; and *types of conflicts that have occurred since oil extraction began*. For each attribute, two to four components were specified as different aspects within the same attribute that can motivate pastoralists to engage in conflict activities against different pastoralists. A script that is read to a respondent consists of all seven attributes where one component per attribute is randomly selected. The order of the attributes is specified to discuss the positive aspects of the oil extraction first followed by the negative consequences, thus priming all attributes in the same order for each individual. Each respondent hears a script that is read by a surveyor, randomly drawn from 3072 potential scenarios ($=4 \times 4 \times 2 \times 3 \times 4 \times 2 \times 4$) where the number of components for a given attribute is in the parentheses. See Table A.III in the Appendix for an example of a script.

After a respondent listens to a script, several questions are asked that will be used for outcome variables. The main outcome variable is based on the question 'How likely do you expect a violent conflict between Turkana and Pokot in the next 12 months?' for which responses were measured on a five-point Likert scale, 'Very unlikely (1), somewhat unlikely (2), neither unlikely nor likely (3), somewhat likely (4), very likely (5).' Using this measure, an ordinal outcome variable is created. An alternative outcome variable is based on the question 'How likely do you expect other types of conflict in Turkana in the next 12 months?' where the responses were similarly measured on a five-point Likert scale.

Attributes and components in the conjoint experiment

Table I provides a summary of attributes and components, and the predicted effect of each component on Turkana respondents' perceived risks of conflicts with a rival, pastoral ethnic group. The expected influence of each consequence on the risk of conflicts between Turkana and the neighbouring pastoral ethnic group under each of the theoretical hypotheses is indicated by '+' ('−') suggesting that the consequence 'increases' ('decreases') the risk of conflict between pastoral ethnic groups.

The first attribute '*Job*' is included primarily to test the opportunism hypothesis, the change in the pastoralist population hypothesis and the inequality hypothesis. The attribute varies among four components including the control condition where no information is presented to the respondent, where the variation focuses on the beneficiaries of the job creation due to oil

TABLE I.
Expected Relationships Under Each Hypothesis.

Attribute	Component	Expected Relationship*
Job	1. No content 2. *Job_Turkana*. New jobs creation benefitting the people of Turkana 3. *Job_Local*. New jobs creation benefitting people near the major oil sites 4. *Job_Kenya:* New jobs creation benefitting Kenyans throughout the country	• *Opportunism Hypothesis* (Territory): + in *Job_Local* • *Change in the Pastoralist Population Hypothesis*: − in *Job_Turkana* & *Job_Local* • *Inequality Hypothesis*:+ in *Job_Turkana* & + in *Job_Kenya* for the 'other conflict' outcome variable
CSR and local public goods	1. No content 2. *LPG_Schools*. New classrooms and schools in Turkana 3. *LPG_Boreholes*. New boreholes in Turkana 4. *LPG_Roads*. New infrastructure (e.g. roads)	• *Inequality Hypothesis*: + in all three components • *Competition over Limited Resources Hypothesis (Water)*: − in *LPG_Boreholes*
Local business and economy	1. No content 2. *Business Opportunities*. New business opportunities in Turkana	• *Change in the Pastoralist Population Hypothesis*: − in *Business Opportunities* • *Inequality Hypothesis*: + in *Business Opportunities*
Limited access	1. No content 2. *Limited Access_Pastoral Resources*. Difficulty accessing resources for pastoralism (e.g. pasture and water) 3. *Limited Access_Land*. Some Turkana residents displaced from their land	• *Competition over Limited Resources Hypothesis*: + in *Limited Access_Pastoral Resources* & *Limited Access_Land*. • *Inequality Hypothesis (Land)*: + in *Limited Access_Land* for the 'other conflict' outcome variable
Environmental consequences	1. No content 2. *Environment_Biodiversity*. Damage to biodiversity (e.g. vegetation and fish) 3. *Environment_Health*. Damage to health conditions 4. *Environment_Pollution*. Air and water pollution	• *Competition over Limited Resources Hypothesis*: + in *Environment_Biodiversity* & *Environment_Pollution*. • *Competition over Limited Resources Hypothesis (Water)*: + in *Environment_Pollution*.
Social change	1. No content 2. *Social Change*. A sudden population increase due to non-residents' migration and resulting social problems	• *Change in the Pastoralist Population Hypothesis*: − in *Social Change* • *Inequality Hypothesis*: + in *Social Change* for the 'other conflict' outcome variable
Increased tension	1. No content 2. *Tension_Intra-community*. Tension over revenue-sharing within Turkana 3. *Tension_Elites*. Tension at the elite-level 4. *Tension with Pokot/Neighbouring ethnic community*. Tension between pastoralist ethnic groups (e.g. Turkana vs. Pokot)	• *Retaliation Hypothesis*: + in *Tension with Pokot/Neighbouring ethnic community* • *Inequality Hypothesis*: + in *Tension_Intra-community* & *Tension_Elites* for the 'other conflict' outcome variable

Notes. Adjusted from Kim & Mkutu (2021); *Unless stated otherwise, the estimates are for the pastoral conflict outcome variable.

extraction. First, if the opportunism hypothesis (over territory) is at work, when primed about job creation near the oil sites (*Job_Local*), respondents are likely to show-higher levels of concern about potential attacks by the Pokot to influence county boundaries between Turkana and West Pokot since the major oil sites are near the Turkana-Pokot border, and the change in the county boundary may also allow West Pokot County to benefit from the oil industry. Second, if the change in the pastoralist population hypothesis is at work, priming for the increases in job opportunities throughout Turkana (*Job_Turkana*) and also near oil sites in Turkana (*Job_Local*) would decrease the respondents' perceived risks of conflict between Turkana and Pokot because the respondents would expect many pastoralists, particularly the young male population, to now be employed in the oil sector, and thus fewer pastoralists would be available to engage in pastoral conflicts. Third, the focus group discussions (See Kim & Mkutu 2021) conducted prior to implementing the survey revealed that the people of Turkana often feel a sense of inequality given that job creation in Turkana disproportionately benefits those who are outsiders or immigrants who moved to Turkana for job opportunities when oil extraction began (Kim & Mkutu 2021). However, Turkana people's resentful feelings toward new immigrants are not likely to intensify the existing tension and pastoral conflicts between Turkana and Pokot. Instead, when primed about job opportunities benefiting people throughout Kenya (*Job_Kenya*), the respondents from Turkana are likely to perceive the benefits of oil extraction as being distributed unfairly, increasing their perceived risks of other types of conflict such as riots and protests (Agade 2017).

The second attribute 'Corporate social responsibility (CSR) and local public goods' allows us to test the inequality hypothesis and the competition over limited resources hypothesis (for water). The attribute varies among four components, including the control condition without any information. First, if the inequality hypothesis explains the motivations for pastoral conflicts in Turkana, improvement in any of the local public goods brought to Turkana can be perceived by the neighbouring communities such as the Pokot as an increase in horizontal inequality between Turkana and their communities. Thus, under the inequality hypothesis, when primed about improvement in local public goods (*LPG_Schools*, *LPG_Boreholes* and *LPG_Roads*) and thus the improved economic development in Turkana, the Turkana respondents' perceived risk of conflicts with the Pokot would increase as they may expect the neighbouring ethnic communities to feel the sense of inequality. Second, Tullow provided and built several boreholes in Turkana County as part of its corporate social responsibility (CSR) (Johannes *et al.* 2015; Mkutu & Mdee 2020), which can lessen the resource constraints facing pastoralists. The existing literature on pastoral conflicts discusses the role of resources including water, vegetation, land and grazing areas (Opiyo *et al.* 2012; Mkutu *et al.* 2019), with some focusing particularly on the role of water and precipitation (Meier *et al.* 2007; Adano *et al.* 2012). If access to water is the main driver of pastoral conflict, the effects of oil extraction on access to water will have a direct impact on the risk of pastoral conflicts. Increased provision of boreholes in

Turkana can potentially ease water constraints, and thus the risks of pastoral conflicts may decrease. If water scarcity is the main contributor to the pastoral conflicts, when primed about the new boreholes built by oil companies in Turkana (*LPG_Boreholes*), the respondents' perceived risks of conflicts with the Pokot will *decrease*.

The third attribute, 'local business and economy', tests the change in the pastoralist population hypothesis and the inequality hypothesis. This attribute varies between two components, including the control condition without any information. First, if the change in the pastoralist population hypothesis explains the conflict between Turkana and Pokot, priming about the new economic and business opportunities in Turkana (*Business Opportunities*) would lead to a *decrease* in the respondents' perceived risks of conflict against Pokot because they would expect that people will increasingly engage in the new business and economic opportunities, leaving fewer people and thus fewer young males to engage in pastoralism and pastoral conflicts. Second, if the inequality hypothesis explains the motivations behind pastoral conflicts in Turkana, priming respondents about the new economic and business opportunities in Turkana (*Business Opportunities*) would *increase* the respondents' perceived risks of conflict with Pokot because the respondents' would be concerned that the Pokot people would feel an inequality in economic and business opportunities between the Turkana and West Pokot counties and potentially try to reverse the imbalance through cattle raiding and border disputes.

The fourth attribute, 'limited access', allows us to test the competition over limited resources hypothesis and it varies among three components including the control condition without any information. If the competition over limited resources hypothesis explains the pastoral conflicts in Turkana, priming the respondent with the negative consequences of oil extraction such as limited access to land and other essential resources for pastoralism (*Limited Access_Land* and *Limited Access_Pastoral Resources*) will increase the respondents' perceived risks of conflict with Pokot. However, in the case of exclusion from land due to displacements (*Limited Access_Land*), the displaced residents will feel resentment over unequal access to land (Peters 2004). Then, the inequality hypothesis could also explain Turkana people's perception toward or motivation for engaging in conflict activities. However, the sense of inequality over unequal access to land will lead to resentment targeted toward the government or oil companies and thus an increase in the perceived risks of other types of conflict such as riots and violent protests against the government or oil companies, rather than higher risks of conflicts against the Pokot.

The fifth attribute, 'environmental consequences', also tests the competition over limited resources hypothesis. It varies among four components including the control condition without any information. If the competition over limited resources is the primary driver of conflict between Turkana and Pokot, then priming about the degradation of the environment essential for pastoralism (e.g. *Environment_Biodiversity* and *Environment_Pollution*) will lead the respondents' to perceive heightened risks of conflict with the Pokot. If access to water is key to pastoral conflicts, then priming about environment and

water pollution (i.e. *Environment_Pollution*) will increase the respondents' perceived risks of conflict with Pokot; other environmental consequences (e.g. *Environment_Biodiversity* or *Environment_Health*) will not have this effect.

The sixth attribute, 'social change' tests the change in the pastoralist population hypothesis. Priming about social changes caused by a rapid influx of people from outside of Turkana (*Social Change*) may strengthen the respondents' perception that a sudden social change has led to a rapid penetration of modern lifestyles, bringing in fundamental changes to the pastoralism-based society including a decrease in the pastoralist population. If the change in the pastoralist population hypothesis is at work, the respondents, when primed about social changes, would expect the risks of pastoral conflicts to decrease given that fewer people and young males would be involved in pastoralism and pastoral conflicts. By contrast, given that the Turkana people's perception of inequality is strengthened by a sudden influx of new immigrants to Turkana searching for new job and business opportunities (Kim & Mkutu 2021), priming about social changes due to sudden population inflows can potentially affect perceptions of conflict risks through the inequality hypothesis. However, since the resentment is not likely to target the Pokot or neighbouring ethnic groups, the inequality mechanism is not likely to explain the respondents' perceived risks of pastoral conflicts. Instead, the perceived risks of other types of conflict such as riots and violent protests against the government or oil companies are likely to increase.

The seventh attribute, 'increased tension' is linked to the retaliation hypothesis and it varies among four components including the control condition without any information. If the retaliation hypothesis, under which the motivation for pastoral conflicts against rival pastoral ethnic groups is to retaliate against an attack by the other pastoral community, explains the recurrence of Turkana people's pastoral conflicts with the Pokot, priming about the increased tension between Turkana and Pokot (i.e. *Tension with Pokot/Neighbouring ethnic community*) will increase the respondents' perceived risks of conflict with Pokot because the respondents will expect retaliatory attacks. Other components such as priming about the tensions over revenue-sharing within Turkana (*Conflict_Intra-community*) and at the elite level (*Conflict_Elites*) may influence the respondents' perception of inequality regarding the benefits of oil extraction, thus increasing the perceived risks of other types of conflicts such as riots and protests. However, the perception of inequality within Turkana or between elites is not likely to be linked to perceived risks of pastoral conflicts between Turkana and Pokot.

Data collection and sampling

The survey was conducted across Turkana County from 24 November to 10 December 2020 using computer-assisted person-to-person (CAPI) interviews. The survey team used a multi-stage, stratified sampling method using each constituency as a stratum where constituency is an electoral area from which a member of the National Assembly is elected. In the first stage, 1–3 wards were

sampled from each of six constituencies, for a total of 12 sampled wards, where ward is an electoral area from which members of the county assembly are elected; several residential locations from each sampled ward were selected according to population density (see Table A.I in the Appendix that presents the sampled wards per constituency and the number of registered voters per ward in the 2017 general election as a proxy for the population density). In the second stage, sampling points were randomly selected out of pre-identified landmarks in each ward. In the third stage, surveyors used a random-walk method to randomly select the first household to sample, then used the pre-identified skip pattern to sample the subsequent households. In the fourth stage, one respondent at each selected household was randomly chosen from the household roster, which includes all household members who are 18 or above present at the time of interview. Our sampling strategy combines convenient sampling methods (for selecting sampling areas) and random sampling methods (for selecting households and respondents) because of the highly mobile nature of our target population, i.e. pastoralists.

A total of 801 sampled respondents gave informed consent. Summary statistics for the sample are provided in Table A.II in the Appendix. Because our study population is pastoralists who are highly mobile and males are typically not present during the day when surveys were conducted, the gender distribution in the sample is not representative of Turkana's population. While the 2019 Census data suggests that 51% of Turkana's population are male, only 33.5% of our respondents were male. In terms of age distribution, our sample is highly representative of Turkana's population who are 18 or above: the average age of the sample respondents is 33.89, which is not significantly different from the average age 33.85 of Turkana's population (above age 18). Our sample is likely to have over-sampled the population with some level of education: 46.14% of our respondents did not receive any formal schooling, in contrast to about 68.7% of Turkana population in the 2019 Census who reported that they have not had access to any education.

Estimation

The Ordinary Least Squares (OLS) estimation is used to estimate the Average Marginal Component Effect (AMCE) of each component following Hainmueller *et al.* (2014). The AMCE of a component is depicted by a regression coefficient for each component included in the regression model as a dummy variable. In the regression equation, each of the seven control condition components (no information) is a baseline category and hence left out of the equation. The AMCE estimates a causal effect of a particular component while all other attributes are averaged over their distribution.

RESULTS

Table II presents the AMCE for each component on respondents' perceived risks of conflict with Pokot in the near future (Column 1) and of other types

TABLE II.

Conjoint Experiment Results for the Perceived Risk of Pastoral Conflict

VARIABLES	1 Conflict with Pokot	2 Other Conflict
Job_Kenya	−0.029	0.021
	(0.157)	(0.162)
Job_Turkana	0.059	0.051
	(0.157)	(0.160)
Job_Local	−0.320**	−0.157
	(0.154)	(0.153)
LPG_Schools	−0.083	−0.015
	(0.164)	(0.166)
LPG_Boreholes	−0.085	−0.140
	(0.152)	(0.157)
LPG_Roads	−0.065	−0.155
	(0.154)	(0.159)
Local Business and Economy	0.011	−0.020
	(0.110)	(0.113)
Limited Access_Land	0.030	−0.103
	(0.138)	(0.139)
Limited Access_Resources	0.076	−0.217
	(0.137)	(0.139)
Environment_Biodiversity	0.296*	0.090
	(0.159)	(0.164)
Environment_Health	−0.117	−0.192
	(0.165)	(0.168)
Environment_Pollution	0.259	−0.107
	(0.161)	(0.164)
Social Change	−0.189*	0.027
	(0.111)	(0.113)
Conflict_Intra-community	−0.191	−0.245
	(0.157)	(0.158)
Conflict_Elites	−0.027	−0.232
	(0.155)	(0.157)
Conflict with Pokot	−0.130	−0.206
	(0.156)	(0.156)
Constant	3.341***	3.356***
	(0.233)	(0.238)
Observations	671	672
R-squared	0.035	0.020
Adjusted R-squared	0.0109	−0.00422

Notes. Robust standard errors in parentheses; *** p <0.01, ** p <0.05, * p <0.1; for each attribute, the baseline category – the level excluded from the estimation – is the control condition (no content).

of conflicts (Column 2). The constant estimate in each model presents the average predicted risk of pastoral and other types of conflict when there was no priming. On average, with no priming for the consequences of oil extraction, the respondents' perceived risk of conflict with the Pokot was 3.341, which corresponds to choosing between 'neither unlikely nor likely' and 'somewhat likely'; similarly, the perceived risk of other conflicts was 3.356.

The estimation results show that 'the change in the pastoralist population hypothesis' is best supported by the sample, with evidence also partially supporting 'the competition over limited resources hypothesis'. First, the change in the pastoralist population hypothesis predicts a negative AMCE of priming for (a) job creation in Turkana (*Job_Turkana*), (b) increased job opportunities near oil sites (*Job_Local*), (c) new economic and business opportunities in Turkana (*Business Opportunities*) and (d) a sudden population increase due to an influx of migration and resulting social problems (*Social Change*); these expectations were supported to some extent. In particular, the AMCE of *Job_Local* was negative and statistically significant ($p < 0.05$) and the AMCE of *Social Change* was negative and weakly significant ($p < 0.1$). The findings indicated that when respondents are primed about a decrease in the pastoralist population in Turkana due to the new opportunities created by oil extractions and the rapid change in traditional, pastoral livelihoods, their perceived risks of conflicts between Turkana and Pokot decrease.

Second, 'the competition over limited resources (overall) hypothesis' predicted a positive AMCE of priming about (a) increased constraints on resources essential to pastoralism (*Limited Access_Resources*); (b) increased constraints on land (*Limited Access_Land*); (c) environmental degradation of biodiversity limiting the resources for pastoralism (*Environment_Biodiversity*); and (d) water and air pollution that limits the availability of essential resources for pastoralism (*Environment_Pollution*). Among these expected relationships, a positive but weakly significant AMCE of *Environment_Biodiversity* ($p < 0.1$ in Column 1) is consistent with the expected relationship. However, the variant of the competition over limited resources hypothesis focusing on whether access to water is the main determinant of pastoral conflicts was not supported because none of the predicted implications (i.e. a negative AMCE of *LPG_Boreholes* and a positive AMCE of *Environment_Pollution*) was found.

Three other alternative hypotheses, namely, the opportunism hypothesis (Territory), the inequality hypothesis, and the retaliation hypothesis, were not supported by the sample. First, 'the opportunism hypothesis (Territory)', which predicted a positive AMCE of priming for increased job opportunities near oil sites (*Job_Local*), is not supported given that the estimate for *Job_Local* in Column 1 was negative and significant ($p < 0.05$). Second, 'the inequality hypothesis' predicting a positive AMCE of priming about improved job and business opportunities that are limited to Turkana (*Job_Turkana* and *Business Opportunities*) and improved public goods in Turkana (*LPG_Schools*, *LPG_Boreholes* and *LPG_Roads*) was not supported, as can be seen in Column 1. If the inequality hypothesis was at work, then priming about the social changes and problems caused by a rapid influx of migrants who moved for economic opportunities in Turkana (*Social Change*), displacement from land (*Limited Access_Land*), and the increased tensions over unequal distribution of oil revenues (*Tension_Intra-community* and *Tension_Elites*) were expected to increase the perceived risks of other conflicts, but none of the AMCE of the components were positive and statistically significant, as seen in Column

2. Third, 'the retaliation hypothesis', which predicted a positive AMCE of priming about the increased tension and conflict risks between Turkana and Pokot during oil extraction (*Tension with Pokot/Neighbouring ethnic community*), was not supported given the negative and statistically insignificant AMCE of the component *Tension with Pokot/Neighbouring ethnic community*, as seen in Column 1.

DISCUSSION

There are some caveats in interpreting the results from this study. In particular, the findings should not be generalised beyond the sample of this study for two reasons. First, the study's sample draws from Turkana County in Kenya, and the conditions facing the residents in Turkana may differ from other pastoral communities. Second, although a total of 801 sampled respondents completed some portions of the survey, there was attrition throughout the survey and 671 completed the conjoint experiment section of the survey. The attrition and the non-random nature of the sampling strategy requires a careful investigation to see how representative the results from this sample can be for the entire Turkana population.

In Table A.IV in the Appendix, I present the summary statistics of key socio-demographic variables by attrition status as well as the t-test results examining whether attrition was random. The result shows that attrition was not likely to be random given that older and female respondents, respondents born outside Turkana, and those without formal schooling were more likely to drop out before the conjoint experiment began. Given that the attrition did not occur randomly, I examined whether the attrition systematically affected the estimation results of the conjoint experiment, and if it did, to what extent the attrition biased the results. To do this, I re-estimated the AMCEs of all components of the conjoint experiment on a set of sub-samples, namely, female- and male-only samples, samples of those below the median age (30) and those above the median age, and samples of those with no formal education and those with some education. See Table A.V in the Appendix for the estimation results.

From a series of t-tests conducted to identify any systematic difference in AMCE estimates across sub-samples, I find that AMCE estimates do not differ for most variables at the 95% confidence interval between female and male sub-samples; neither do they differ between the samples with respondents under 30 and respondents 30 or above. However, AMCE estimates for *Job_Local*, *Local Business and Economy* and *Environment_Pollution* differ between the samples of respondents with no formal education and respondents with some level of education. First, regarding the *Job_Local* variable, the attrition of respondents with no formal education would have weakened the size of the AMCE, given that the extent of the negative AMCE for *Job_Local* was larger for the sample of respondents with no formal education than the one of respondents with some education. That is, the change in the pastoralist population hypothesis could have been more strongly supported if there was no attrition of

respondents with no formal education. Second, the AMCE of *Local Business and Economy* could have been negative if there was no attrition, which would have further supported the change in the pastoralist population hypothesis while not substantively reversing the conclusions regarding other hypotheses. Third, the *Environment_Pollution* variable is likely to be biased downward as a result of the attrition of respondents with no formal education who tend to believe that environmental degradation through pollution increases the risk of conflicts between Turkana and Pokot. Without the attrition, the respondents' perceived risks of pastoral conflicts when primed about the water and environmental pollution of oil extraction could have been positive and statistically significant, supporting the competition over limited resources hypothesis. Therefore, the attrition is not likely to have affected the substantive findings of how oil extraction in Turkana has influenced the respondents' perception of risks of pastoral conflicts.

CONCLUSIONS

Pastoral conflicts – the conflict between pastoral ethnic groups over resources mostly in the form of cattle and livestock raiding – have long been the source of instability in semi-arid and arid land areas in eastern Africa largely inhabited by pastoralist communities (Mkutu & Mdee 2020). As several countries in eastern Africa became oil producers, however, the conflict dynamics in the region have changed. In particular, oil extraction has put pressure on resources essential to pastoralism such as water, pasture and grazing areas due to resulting environmental degradation. It also increased the perceived inequality between communities due to unequal distribution of oil revenues and economic opportunities. Furthermore, the oil industry has changed traditional, pastoral-based livelihoods. All of these factors have affected the risks of pastoral conflicts (Johannes *et al.* 2015; Shilling *et al.* 2015, 2018; Agade 2017).

To examine whether and how oil extraction affects the dynamics of pastoral conflicts, this study has conducted a survey experiment in Turkana County in north-western Kenya, one of the most economically and politically marginalised counties where the main industry has been pastoralism (Mkutu & Mdee 2020). The people of Turkana have endured a protracted pastoral conflict with other pastoralist ethnic groups across county and national borders. This study has empirically tested which of the alternative hypotheses, namely (a) the competition over limited resources hypothesis, (b) the opportunism hypothesis, (c) the inequality hypothesis, (d) the retaliation hypothesis and (e) the change in the pastoralist population hypothesis, best explains whether and how oil extraction in Turkana County affects pastoral conflicts.

The results from a conjoint experiment conducted on a sample of 801 residents of Turkana show that the change in the pastoralist population hypothesis best explains the Turkana residents' perceived risks of pastoral conflicts with Pokot, followed by the competition for limited resources hypothesis. That is, the respondents from Turkana County expected the risk of pastoral conflicts in the near future to *decrease* when they were primed about the new job

opportunities in the oil industry in Turkana and fundamental social changes in Turkana due to an influx of immigrants, both of which suggest a decrease in the pastoralist population. This suggests that the respondents expect a reduced pastoralist population to decrease the risks of pastoral conflicts as there are fewer people to engage in the pastoral conflicts. The respondents expected that the risks of pastoral conflicts would increase when primed about the environmental degradation caused by oil extraction, consistent with the expectation of the competition over limited resources hypothesis, although this result was only weakly statistically significant. No evidence supporting the other three alternative hypotheses was found in the sample.

This study makes two significant contributions to the literature. First, this is the first study to use an experimental approach to distinguish the causal relationships between oil extraction and pastoral conflicts in Africa. Identifying a causal relationship is challenging especially when multiple causal mechanisms are interconnected. By randomly assigning information that primes about a specific consequence of oil extraction, the experimental design has allowed separating the causal relationships between potentially interconnected sources of conflicts and pastoral conflicts. Second, this study not only introduced the change in the pastoralist population mechanism, but also presented a novel finding suggesting that the size of the pastoralist population would have been an important determinant of pastoral conflicts in Turkana. Although the findings from this study should not be generalised beyond Turkana County for external validity, the results are robust to the non-random component of the sampling process and sample attrition. While the residents of Turkana may expect environmental degradation that intensifies competition over resources to worsen the risks of pastoral conflicts, they also seem to view that if the oil industry brings fundamental changes to pastoralism-based livelihoods, fewer people will engage in pastoralism and thus pastoral conflicts.

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APPENDIX.

TABLE A.I
Sampled Wards and Number of Registered Voters for 2017 General Elections.

No.	Constituency	Sampled Wards	Number of Registered Voters
1	Turkana South	Lokichar	12,170
2		Lobokat	2770
3		Katilu	11,774
4	Turkana East	Lokori/Kocodin	7751
5	Turkana Central	Kerio Delta	9087
6		Kalokol	7570
7		Lodwar	15,532
8	Turkana North	Lake zone	8772
9	Turkana West	Nanam	2581
10		Lokichoggio	4718
11		Songot	2888
12	Loima	Loima	3469

Notes: Information from the Kenya's Independent Electoral and Boundaries Commissions; <https://www.iebc.or.ke/>

TABLE A.II
Descriptive Statistics of Key Pre-Treatment Variables.

	Sample in the Study			2019 Kenya Population and Housing Census		
Variable	Observation	Mean	Std. Dev	Observation	Mean	Std. Dev
Age	767	33.88657	13.15727	431,460*	33.85	16.54
Gender (male)	791	0.335019	0.472296		0.51	0.5
Born in Turkana	788	0.936548	0.243929			
Oil	793	0.218159	0.413257			
Ethnicity (Turkana)	801	0.952559	0.212712			
Variable	Frequency	%	Cumulative	Frequency	%	Cumulative
Education						
No formal schooling	365	46.14	46.14	584,977	68.7	
Standard 1	13	1.64	47.79			
Standard 2	11	1.39	49.18			
Standard 3	11	1.39	50.57			
Standard 4	25	3.16	53.73			
Standard 5	13	1.64	55.37			
Standard 6	15	1.9	57.27			
Standard 7	32	4.05	61.31			
Standard 8	72	9.1	70.42			
Form 1	6	0.76	71.18			

TABLE A.II (*Cont.*)

Variable	Frequency	%	Cumulative	Frequency	%	Cumulative
Form 2	27	3.41	74.59			
Form 3	22	2.78	77.37			
Form 4	82	10.37	87.74			
College	65	8.22	95.95			
Some University	9	1.14	97.09			
University completed	6	0.76	97.85			
Graduate degree	8	1.01	98.86			
Don't know	3	0.38	99.24			
Refused to answer	6	0.76	100			
Total	791	100		926,976		100

Note: * for age 18–100+; Information on the 2019 Kenya Population and Housing Census from the Kenya's National Bureau of Statistics: <https://www.knbs.or.ke/publications/>

TABLE A.III

Example Script of Informational Vignette.

Since the discovery of oil in Turkana in 2012, people have experienced several benefits from production of oil. In particular,
[many new jobs were created and benefitted people of Turkana.] [New boreholes were also dug in Turkana.] […]
Although oil production and export led to many benefits, there have been some concerns as well. For example,
[there has been a difficulty accessing pasture, water, and several important sites.] [There was air and water pollution resulting from oil extraction and production.] […] [There were some tensions between communities within Turkana County over sharing of benefits such as jobs and contracts as tenders.]

Note. The value in every [] is randomly selected out of 2–4 components in a given attribute. […] indicates the selected component contains no information. The common prompt is italicised.

TABLE A.IV
Summary Statistics by Attrition.

	Completed			Attrition				
Variable	Observation	Mean	Std. Dev	Observation	Mean	Std. Dev	Difference	T-test
Age	651	32.87	12.60	116	39.59	14.73	−6.73	−5.16
Gender	671	0.36	0.48	120	0.22	0.41	0.14	3.00
Born in Turkana	669	0.94	0.25	119	0.94	0.24	−0.01	−0.22
Oil wells	671	0.22	0.41	122	0.20	0.41	0.02	0.38
Turkana	671	0.96	0.19	130	0.90	0.30	0.06	3.09
Variable	Frequency	%	Std. Dev	Frequency	%	Std. Dev	Difference	T-test
Education								
No formal schooling	292	0.44	0.50	73	0.61	0.49	−0.17	−3.53
Standard 1	10	0.01	0.12	3	0.03	0.16	−0.01	−0.80
Standard 2	9	0.01	0.11	2	0.02	0.13	0.00	−0.28
Standard 3	8	0.01	0.11	3	0.03	0.16	−0.01	−1.13
Standard 4	23	0.03	0.18	2	0.02	0.13	0.02	1.02
Standard 5	12	0.02	0.13	1	0.01	0.09	0.01	0.76
Standard 6	14	0.02	0.14	1	0.01	0.09	0.01	0.93
Standard 7	30	0.04	0.21	2	0.02	0.13	0.03	1.44
Standard 8	66	0.10	0.30	6	0.05	0.22	0.05	1.70
Form 1	6	0.01	0.09	0	0.00	0.00	0.01	1.04
Form 2	25	0.04	0.19	2	0.02	0.13	0.02	1.14
Form 3	19	0.03	0.17	3	0.03	0.16	0.00	0.20
Form 4	77	0.11	0.32	5	0.04	0.20	0.07	2.43
College	57	0.08	0.28	8	0.07	0.25	0.02	0.67
Some University	7	0.01	0.10	2	0.02	0.13	−0.01	−0.60
University completed	6	0.01	0.09	0	0.00	0.00	0.01	1.04
Graduate degree	8	0.01	0.11	0	0.00	0.00	0.01	1.20
Don't know	1	0.00	0.04	2	0.02	0.13	−0.02	−2.50
Refused to answer	1	0.00	0.04	5	0.04	0.20	−0.04	−4.75
Total	671			120				

TABLE A.V
Testing the Effects of Attrition.

VARIABLES	(1) female	(2) male	(3) under 30	(4) 30 or above	(5) no education	(6) some education
Job_Kenya	0.007	−0.152	−0.069	−0.018	−0.116	0.066
	(0.196)	(0.275)	(0.231)	(0.216)	(0.228)	(0.218)
Job_Turkana	−0.028	0.179	0.181	−0.098	−0.109	0.233
	(0.197)	(0.278)	(0.237)	(0.214)	(0.218)	(0.228)
Job_Local	−0.457**	−0.120	−0.385	−0.314	−0.784***	−0.012
	(0.190)	(0.257)	(0.234)	(0.204)	(0.225)	(0.209)
LPG_Schools	−0.055	−0.051	−0.116	−0.098	0.012	0.061
	(0.205)	(0.280)	(0.245)	(0.222)	(0.259)	(0.223)
LPG_Boreholes	−0.160	0.118	−0.231	0.020	0.087	−0.106
	(0.189)	(0.261)	(0.234)	(0.207)	(0.240)	(0.199)
LPG_Roads	−0.084	0.020	−0.369	0.169	0.247	−0.242
	(0.190)	(0.273)	(0.230)	(0.210)	(0.242)	(0.204)
Local Business and Economy	0.097	−0.094	0.162	−0.122	−0.227	0.222
	(0.140)	(0.197)	(0.166)	(0.152)	(0.163)	(0.150)
Limited Access_Land	0.082	−0.065	0.232	−0.164	−0.129	0.111
	(0.175)	(0.234)	(0.210)	(0.181)	(0.196)	(0.191)
Limited Access_Resources	0.197	−0.115	0.266	−0.114	−0.068	0.146
	(0.171)	(0.234)	(0.198)	(0.189)	(0.206)	(0.186)
Environment_Biodiversity	0.271	0.372	0.300	0.269	0.454*	0.172
	(0.196)	(0.278)	(0.229)	(0.226)	(0.243)	(0.207)
Environment_Health	0.083	−0.438	−0.282	−0.044	0.225	−0.408*
	(0.207)	(0.282)	(0.251)	(0.225)	(0.249)	(0.221)
Environment_Pollution	0.295	0.205	−0.073	0.551**	0.769***	−0.127
	(0.195)	(0.298)	(0.244)	(0.214)	(0.235)	(0.214)
Social Change	−0.312**	0.029	−0.208	−0.209	−0.239	−0.166
	(0.138)	(0.189)	(0.168)	(0.150)	(0.164)	(0.149)
Tension_Intra-community	−0.388**	0.020	−0.341	−0.040	−0.394*	−0.089
	(0.196)	(0.272)	(0.220)	(0.227)	(0.238)	(0.212)

Tension_Elites	−0.133	0.184	−0.034	0.095	−0.344	0.260
	(0.193)	(0.269)	(0.234)	(0.217)	(0.228)	(0.210)
Tension with Pokot/Neighbouring ethnic community	−0.194	−0.071	−0.330	0.027	−0.321	−0.053
	(0.191)	(0.284)	(0.225)	(0.222)	(0.229)	(0.213)
Constant	3.396***	3.198***	3.413***	3.350***	3.529***	3.130***
	(0.277)	(0.424)	(0.360)	(0.311)	(0.335)	(0.316)
Observations	432	239	307	364	292	379
R-squared	0.053	0.063	0.074	0.046	0.115	0.046
Adjusted R-squared	0.0161	−0.00478	0.0227	0.00167	0.0639	0.00370

Notes. Robust standard errors in parentheses; *** p <0.01, ** p <0.05, * p <0.1; columns vary by sub-samples used; the outcome variable in all columns is the perceived likelihood of pastoral conflict; for each attribute, the baseline category – the level excluded from the estimation – is the control condition (no content).