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RESEARCH ARTICLE

Sacrificing environmental degradation and conflict risks for economic development: public attitudes to LAPSSET in Turkana County, Kenya*

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Abstract

Are residents of developing countries willing to support economic development despite environmental damage and conflict risks? To examine this question, we conducted a survey experiment in Turkana County, home to an economically and politically marginalised pastoral community in Kenya but newly impacted by a large-scale infrastructure development project, namely, the Lamu Port–South Sudan–Ethiopia Transport (LAPSSET) corridor project, which will generate economic development at the expense of significant environmental degradation and intensified conflict risks. We found that the majority of our respondents in Turkana support LAPSSET regardless of the expected environmental damages and conflict risks. Although concerns about unequal distribution of economic opportunities and cross-border ethnic conflicts decreased support for LAPSSET, the decreases in support were substantively small and only found conditionally based on certain sub-groups. Our results align with earlier literature findings that residents of developing countries are willing to tolerate negative consequences while prioritising economic development.

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Introduction

The environmental cost of economic development in developing countries and public attitudes towards it have been widely studied (Dunlap *et al.* 1993; Bloom 1995; Dunlap & Mertig 1995; Inglehart 1995; Leiserowitz 2007; Dunlap & York 2008; Sandvik 2008; Kvaloy *et al.* 2012; Kim & Lee 2020). Inglehart (1995) noted that citizens in countries with post-materialistic views and those experiencing negative environmental impacts tend to be more concerned about the environment. However, empirical research on the relationship between a country's economic development and public environmental concerns yields mixed results: negative (Bloom 1995; Dunlap & Mertig 1995; Leiserowitz 2007), positive (Franzen & Meyer 2010) or no association (Dunlap & York 2008; Kvaloy *et al.* 2012). That is, whether residents of developing countries support economic development despite expected environmental costs remains a topic of debate.

The debate is ongoing, especially in the area of climate action for least-developed countries (LDCs). Sokona & Denton (2001) and Huq *et al.* (2004) note that LDCs' priorities differ from those of developed countries, and they often raise objections to climate mitigation policy. The rationale for such a stand is that they have generally contributed little to greenhouse gas emissions and will suffer most from its effects, a point that is widely conceded. Further, fossil fuels remain abundant and cheap and can be used to further economic development, which can, in turn, also improve resilience and adaptation to climate change effects. Therefore, as the African Union President stated in 2022, fossil fuels should be considered as a transitional energy source for Africa, allowing economic development to be prioritised above environmental cost within the specific developing-world context (Caramel 2022a). However, another turn to this argument is that fossil fuel expansion disproportionately satisfies Western needs and benefits Africa only slightly (Caramel 2022b).

The economic needs of LDCs may explain the mixed results in the public opinion literature. Local contexts determine the response, especially in communities heavily reliant on natural resources. Environmental damage threatens economic development and may lead to conflict. Previous studies have examined the relationship between resource scarcity and conflict risks, with some authors emphasising power struggles and access as important factors (Gleditsch 1998; Hauge & Ellingsen 1998; Raleigh & Urdal 2007; Floyd 2008; Theisen 2008; Urdal 2008; Le Billon & Duffy 2018). Scarcity exacerbates existing frictions, catalysing conflict (Mildner *et al.* 2011).

This study explores how a marginalised pastoralist community in Turkana County, Kenya, perceives economic development alongside its negative consequences, such as environmental degradation and conflict risks, particularly in relation to the Lamu Port–South Sudan–Ethiopia Transport (LAPSSET) corridor project. This project, supported by Kenya, South Sudan, and Ethiopia, entails a 500-metre-wide corridor incorporating an oil pipeline and road link from

Turkana's oil fields. Despite anticipated economic benefits from the LAPSSET corridor project, Turkana's pastoralists, traditionally engaged in livestock farming, also foresee environmental damage and intensified conflicts with neighbouring ethnic groups as they already face pressures from land expropriation and arid conditions, which can escalate conflicts over resources (Mkutu *et al.* 2019).

Our survey experiment, embedded in a larger opinion survey of 801 Turkana residents, uses a full factorial design to identify the relative causal effects of multiple factors (details are described in the authors' previous publications drawing from separate experiments from the same opinion survey, Kim & Mkutu 2021; Kim 2023). We estimate Turkana residents' support for LAPSSET under various scenarios of economic benefits, environmental costs, and conflict risks, examining how support changes as these factors vary. Our results show that despite high environmental costs and intensified conflict risks, Turkana residents prioritise economic development, maintaining overall support for LAPSSET. Although subgroup analyses revealed that various aspects of economic benefits and conflict risks have different impacts on support for LAPSSET among different groups, overall support for LAPSSET remains strong in most subgroups. This aligns with prior research, which indicates a preference for economic growth over environmental protection in developing countries (Kim & Mkutu 2021; Kim 2023).

The Relationship between Economic Development and Public Concern for Environmental Consequences

The question of whether environmental concerns vary with a country's economic development and modernisation remains contentious. Early literature suggested that residents of developing nations prioritise economic survival over environmental quality (Beckerman 1974; Leff 1978; Dunlap & Mertig 1995). This perspective attributed higher concern for the environment in developed countries to post-materialist values stemming from increased affluence after the Second World War (Inglehart 1990). However, empirical studies from the 1990s, including Inglehart's analysis of World Value Survey data from 43 countries, yielded mixed results, indicating high environmental concern among residents of both developing nations facing severe pollution and developed nations with post-materialist values (Dunlap & Mertig 1995; Inglehart 1995; Kim & Lee 2020). This suggests a complex, multidirectional relationship between environmental concern and economic development.

Using Gallup's 1992 'Health of the Planet (HOP)' survey, Dunlap *et al.* (1993) find that residents of developing countries share strong environmental concerns similar to or greater than those in developed countries, attributing this to the direct link between environmental quality and human survival needs. They also note the global nature of environmental concern. Subsequent research (Bloom 1995; Dunlap & Mertig 1995) consistently finds high levels of environmental concern in developing countries. Leiserowitz (2007) utilises GlobeScan 1998–2001 surveys to demonstrate that residents of developing countries not only share similar concerns with developed countries

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but are even more concerned about climate change, possibly due to country-specific concerns about severe impacts and adaptation difficulties. Similarly, Sandvik (2008: 334) suggests that wealthier nations may suppress the 'uncomfortable truth' of their responsibility for climate change.

Some view the relationship between public opinion on the environment and affluence as unsettled, partly due to methodological limitations (Franzen & Meyer 2010). For instance, Kim & Lee (2020) highlighted biases in existing environmental attitude research, proposing experimental designs to address them. Their online survey experiments in the U.S. and India revealed decreased support for foreign direct investment (FDI), generating economic benefits, when environmental costs were also expected. The decrease was more pronounced among U.S. respondents, aligning with previous findings suggesting a greater willingness among residents of developing countries to tolerate environmental damage for economic gains (Kim & Lee 2020).

Various personal and social factors, such as childhood experiences, education, personality traits, values and political beliefs, influence pro-environmental concerns (Gifford & Nilsson 2014). Additionally, environmental and scientific media can heighten environmental concern, while political media may diminish it (Zhao *et al.* 2011). Social capital can also significantly influence public opinion on environmental issues by exposing individuals to diverse perspectives within social networks (Macias & Nelson 2011).

Economic Development, Environmental Consequences and Conflict Risks in Developing Nations

When it comes to public opinion in developing nations, the public perception of economic development and the development-environment trade-off is likely to depend on other factors, such as conflict risks. Studies have established a positive correlation between poverty and conflict risks (Hess & Orphanides 1995; Fearon & Laitin 2003; Collier & Hoeffler 2004; Fearon & Laitin 2004; Miguel *et al.* 2004; Blomberg *et al.* 2006; Miguel & Satyanath 2011) and actively examined how environmental degradation leads to conflict by exacerbating poverty (Bächler 1999; de Soysa & Gleditsch 1999; Ohlsson 2000; Diehl & Gleditsch 2001).

Ohlsson (2000) labels the resource scarcity-conflict link as 'livelihood conflicts', given that environmental degradation in developing nations, which heavily rely on primary resources like water and land, results in the loss of livelihoods. This, in turn, increases unemployment among youth, potentially leading to their recruitment into the armed forces and escalating conflict risks. de Soysa & Gleditsch (1999) noted that conflicts in the 1990s, within and between states, were concentrated in primarily agriculture-based regions. This suggests that environmental degradation, causing livelihood loss in agricultural societies, heightens conflict susceptibility in those areas.

The scarcity–conflict relationship is a debated one in terms of the relative contribution of resource scarcity versus political and institutional factors. On the one hand, studies on pastoral conflicts in the Horn of Africa consider livelihoods to be a key driver. Constraints on the availability of primary resources

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and hunger caused by drought and natural disasters motivate pastoral conflicts, thus qualifying as 'livelihood conflicts' (Schilling *et al.* 2012).

On the other hand, conflicts often result from mobility into new areas under the control of other ethnic groups, which may reinvigorate rivalries and lead to opportunistic raids. Therefore, inter-ethnic rivalries and competitions are also important conflict drivers (Mkutu *et al.* 2021). In fact, studies show that inter-communal conflict associated with development projects is not always about livelihoods disrupted by environmental degradation but about inter-ethnic competition for various benefits, such as jobs, opportunities, compensation and royalties. These conflicts may have strong ethnopolitical dimensions, as observed in the cosmopolitan county of Isiolo, where LAPSSET has fuelled land speculation by elites and inter-ethnic territorial conflict (Mkutu *et al.* 2019).

However, despite the 'greed' motivations of many elites and politicians, conflict at the grassroots level is, to a significant extent, motivated by subsistence needs. Additionally, conflict resulting from environmental degradation by development projects is not only inter-ethnic but also directed against investors due to land take, which again strains livelihoods (Johannes *et al.* 2015; Schilling *et al.* 2015, 2018; Agade 2017). While community–investor conflicts are also about other issues like jobs and opportunities, these may be linked to livelihood challenges, which may pre-exist but are exacerbated by development projects (Agade 2017).

LAPSSET Development Project and Impact in Turkana

Experience of economic development

Turkana County is a semi-arid land area in northwest Kenya, bordering Uganda, South Sudan and Ethiopia internationally, and Baringo, West Pokot and Samburu counties domestically. The residents of Turkana predominantly consist of the Turkana ethnic group, who are mainly pastoralists, as are all neighbouring communities across both international and county borders (Schilling *et al.* 2014). Recurrent cycles of conflict exist between the Turkana and other pastoralist communities such as the Pokot, Karimojong, Nyangatom, Toposa and Merrile (Agade 2015). The region has also been prone to droughts and other types of natural disasters, which have exacerbated insecurity by further intensifying competition over scarce resources (Schilling *et al.* 2012). Okumu *et al.* (2017) find that the existing inter-ethnic cleavages among pastoralist communities are exacerbated by political and business elites who mobilise raiders to compete for already scarce resources for their own political and economic gain. Low population density, geographical and climatic challenges, ongoing conflict risks, and the government's inability to provide services and security in the region all contribute to the economic and political marginalisation of Turkana County.

Although the Turkana people's livelihoods continue to depend heavily on pastoralism, they have experienced both benefits and costs from a LAPSSET-related project, specifically oil extraction and production, for about nine years since viable quantities of oil were discovered in Turkana County

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in 2012. Following a four-year exploration drilling phase, foreign oil companies began extracting and producing oil, and Kenya successfully conducted the Early Oil Pilot Scheme (EOPS) in 2018, which involved the small-scale transport of oil by road to the port of Mombasa for export. By August 2019, 14 million USD in revenues were generated from crude oil exports from Turkana County, according to Kenya's Bureau of Statistics.

Little of this national revenue actually reached the local community. Revenue-sharing was structured using a formula of 75% to the national government, 20% to the Turkana County government, and 5% to the local community. In practice, however, sharing was ambiguous and politicised, and its benefits were not realised, leading communities to demand 'the ATM option', that is, direct cash handouts – though this has not happened at the time of writing (Johannes *et al.* 2015; Schilling *et al.* 2015; Agade 2017; Schilling *et al.* 2018). Economic benefits to the people of Turkana were mainly felt during the four-year oil exploration phase, in which they were given some unskilled jobs (most Turkana were unable to take up semi-skilled jobs due to low levels of education), security jobs, tenders to supply materials, and experienced a boom in business in the local town of Lokichar and some CSR projects. However, the oil company downscaled its operations in the county in early 2021, for both internal and external reasons, and the people of Turkana experienced a loss of jobs and business opportunities (Kim & Mkutu 2021). Aalders *et al.* (2021) note that the reactions of communities to the project, whether they attempted to gain advantages or cause disruptions, highlight the ongoing political and economic marginalisation that the LAPSSET project was initially intended to address.

In addition to the economic benefits, improved security provision in the area by government agencies was also one of the positive effects; this consisted of increased police presence to protect oil production and a disarmament programme that helped to reduce violence in the area. Kim & Mkutu (2021) view this improved security as temporary because, with the downscaling mentioned, there was a corresponding reduction in security personnel at the site.

Environmental degradation was a prominent concern, including air and water pollution (Schilling *et al.* 2015, 2018), damages to fisheries and livestock and health effects. Other concerns included rapid social changes due to immigration (Kim & Mkutu 2021) and displacements from community land (Agade 2017), which led to protests against the oil companies and the government of Kenya (Johannes *et al.* 2015; Schilling *et al.* 2015, 2018; Agade 2017).

Kim & Mkutu (2021) present a different perspective compared to qualitative studies based on small and selective samples, which mainly describe the challenges experienced by the people of Turkana after oil extraction began. In late 2020, survey research and experiments conducted across all six constituencies in Turkana County found that the overall attitude towards oil extraction in Turkana County was mostly positive.

The LAPSSET corridor project

The Government of Kenya has initiated the Lamu Port–South Sudan–Ethiopia Transport (LAPSSET) corridor project as a key part of its Vision 2030

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Plan. This extensive infrastructure endeavour aims to connect oil fields in Turkana County to a newly established port in Lamu on Kenya's coast (Mosley & Watson 2016; Mkutu 2022). There will be a 50-km-wide special economic zone across the corridor, while the corridor itself is around 500 m wide and will consist of a railway, a highway, a fibre-optic cable and a crude oil pipeline (LAPSSET Corridor Development Authority n.d.). The corridor will traverse nine counties of northern Kenya that have been economically and politically marginalised, including Turkana, Isiolo and Samburu counties in the northwestern part of Kenya (Mkutu *et al.* 2021) (see Figure 1).

In addition, the economic development and opportunities generated by this project are expected to attract foreign investment and boost the tourism industry, creating further economic benefits for the local communities through infrastructure building, business opportunities and new job creation. LAPSSET will cross from southeast to north Turkana, and along with associated developments, it is likely to cause significant disruption to pastoralist mobility routes, displacement from grazing grounds, pollution of water and competition for water sources. On the positive side, there may be new economic opportunities, services and connectivity.

Some components of the project have been completed, such as three berths of Lamu Port and some road sections, including the road renovation northwards from the main town in Turkana – Lodwar – to Nadapal on the South Sudan border. The oil pipeline project is in the planning stage and has, at

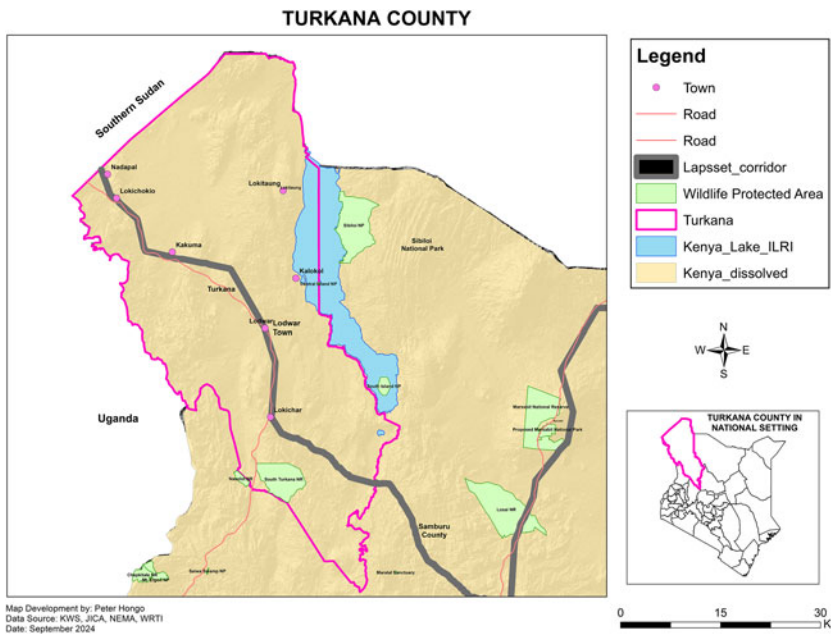

Figure 1. LAPSSET corridor route.
Source: LAPSSET Corridor Development Authority 2019.

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present, been planned to pass only from Lokichar oil fields south of Lodwar town to Lamu Port, though the ultimate plan is to connect to Juba in South Sudan. However, Bachmann *et al.* (2021) comment that the bold lines on the LAPSSET maps obscure many practical uncertainties; the route has already changed greatly in 2019 from the original widely published 2017 map. The project has been preceded by land speculation on a large scale surrounding the route, including in Turkana, with accompanying land injustices, contestations and political jostling as several authors have explored (Elliott 2016; Kochore 2016; Mosley & Watson 2016: 53; Enns & Bersaglio 2019; Chome 2020; Lind *et al.* 2020).

Studies expect there to be further negative consequences of the mega-development project, including social–ecological changes and environmental degradation (Mkutu 2022), displacements from community-owned land by government and investors (Aalders *et al.* 2021), and the exacerbation of existing tensions and conflicts across ethnic groups due to intensified competition over economic benefits (Mkutu *et al.* 2021). We expect that residents of Turkana are likely to be familiar with the potential impacts of a large-scale economic development project such as LAPSSET, given their experiences of the impact and consequences of economic development from oil extraction since oil discovery in 2012.

There are several mechanisms through which residents of Turkana may have received information about the LAPSSET project. While illiteracy is high in Turkana, constraining information dissemination through written documents, some households in Turkana have access to TV even in rural areas, and radio is more widespread. In addition, the settlements near the proposed LAPSSET site were part of participation exercises, and the LAPSSET Corridor Development Authority set up an office in the county capital, Lodwar. Thus, despite lacking resources for information dissemination, those living in and near such settlements are likely to have received a positive message about LAPSSET from the Authority (Mkutu *et al.* 2021). Moreover, chiefs and local politicians are involved in disseminating information and influencing public opinion in various ways. Residents have also had some exposure to environmental activism and capacity-building in climate resilience by civil society organisations and donors in the development realm, while some, especially urban-based locals, are involved in WhatsApp groups discussing development impacts and politics.

Research Design

Our study draws from a survey experiment using a factorial design to examine the Turkana people's attitude towards LAPSSET and to identify how different levels of economic benefits, environmental costs, and conflict risks associated with the economic development phase affect their attitude. Earlier, we discussed the interconnectedness of environmental degradation and conflict risks, along with the various factors influencing respondents' attitudes towards economic development and the LAPSSET project. This interconnectedness makes it challenging to isolate the causal relationships between each factor

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and respondents' support for LAPSSET in observational studies. To address this concern, we used a factorial design in which information on various factors related to the benefits and costs of the LAPSSET project was independently and randomly assigned to each respondent. This approach allows us to identify the relative causal effect of each factor on respondents' overall support for LAPSSET.

We embedded our experiment in a larger public opinion poll survey and used computer-assisted person-to-person interviews (CAPI) to collect data. Our study's target population was the residents of Turkana County who were at least 18 years old. Thus, our sample was drawn from all six constituencies in Turkana County. The survey was conducted by a team of researchers of Turkana ethnicity in the respondents' native languages: English, Swahili and Turkana. The data collection began on 20 November and was completed on 10 December 2020.

Sampling and data collection

Although a completely random sampling method is the most ideal for capturing the unbiased and representative views of residents of Turkana County, our study population, obtaining a completely representative sample through random sampling was challenging due to the low population density of Turkana County residents and the predominantly pastoralist lifestyle that involves frequent movement throughout the year. Due to this challenge, we used a combination of convenience and random sampling methods. Convenience sampling was used when selecting wards from each constituency. We sampled 1–3 wards per constituency that had a relatively dense population to ensure data collection would be feasible. A detailed description of the sampled wards and our final sample is provided in our companion papers (Kim & Mkutu 2021; Kim 2023).

In each sampled ward, we used a multi-stage random sampling method, including the sampling of enumeration areas, households and respondents. First, four enumeration areas were randomly selected in each sampled ward from a list of major markets and landmarks. Second, starting points were randomly selected in each enumeration area, and each interviewer used a random walk and pre-determined skip pattern to select a household to interview. Third, at each sampled household, the interviewer created a household roster of all household members present at the time of the interview and eligible to be interviewed (e.g. 18 years or older). A randomly selected member was invited for the interview and presented with informed consent. A total of 801 respondents gave informed consent and participated in the interview.

Among the respondents who initially gave consent, only those who indicated they had heard of LAPSSET were qualified to participate in this experiment. Those who confirmed awareness proceeded to additional qualification questions regarding their knowledge of LAPSSET's routes and exposure to related information. A unique informational vignette was read to each respondent by an interviewer, describing the project's various positive and negative effects with randomly selected alternative values.

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Factorial design

We used a factorial design as our experimental approach to investigate the Turkana people's perception of the LAPSSET project and to understand how different information about economic benefits, environmental costs and conflict risks associated with LAPSSET influence their attitudes. In this design, we randomly varied information on different levels of economic benefits, environmental costs and conflict risks associated with LAPSSET. This method allowed us to assess the respondents' support for LAPSSET, considering the various implications and consequences of the project. It also facilitated the comparison of the relative causal effect of each factor in influencing the respondents' attitudes. To present the information, we utilised an informational vignette with a script containing randomly drawn details, which was read to each respondent by the interviewer.

Based on existing literature (Mkutu 2022), we have categorised various aspects of the LAPSSET project into five groups. The positive effects include economic development and job creation, while the negative consequences consist of limited resources and land, environmental costs and conflict risks related to LAPSSET. Table I provides a summary of the factorial experiment design, which encompasses all five factors and the alternative levels (i.e. values) for each factor.

Each factor varies among 2–4 values (i.e. levels). We initially aimed to collect a sample size of approximately 800; however, this sample size would decrease significantly if many respondents were unfamiliar with LAPSSET, as our experiment could only be administered to those who had heard of LAPSSET. Anticipating a small sample size, we expected that including more than three levels would significantly constrain our ability to detect a statistically significant effect. Therefore, with the exception of the type of conflicts, for which we decided to include four separate conflict types based on literature, we limited the number of levels to 2 or 3 per factor.

The factor 'Economic development' has three levels (alternatives) of information regarding the beneficiaries of the economic benefit, namely, 'Kenya, Ethiopia and South Sudan (*Development_all*)', 'Kenya (*Development_Kenya*)' and 'Turkana County (*Development_Turkana*)'. The factor Job creation also has three levels of information regarding the beneficiaries of new job creation associated with LAPSSET, including 'people of Kenya, Ethiopia and South Sudan (*Job_all*)', 'many Kenyans throughout the country (*Job_Kenya*)' and 'many people of Turkana (*Job_Turkana*)'.

The expected negative consequences of LAPSSET are mainly the destruction of people's livelihoods, environmental damages and conflict risks. The factor limited resources and land has two alternatives, including limited access to 'pasture, water and other important sites (*Access_resources*)' for pastoralism and the risks of 'displacement and restriction of pastoral movements due to land acquisition by the government of Kenya (*Access_displacement*)'. The factor Environmental costs includes two alternatives regarding the types of environmental damages, namely, 'the destruction of biodiversity such as vegetation (*Environment_bio-diversity*)' and 'water and environmental pollution

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Table I. Experimental design.

Factors	Levels (Alternatives)
1. Economic development (random selection among three conditions)	• *(Development_all)* LAPSSET will bring economic development to Kenya, Ethiopia and South Sudan. **[Control]** • *(Development_Kenya)* LAPSSET will bring economic development to Kenya. • *(Development_Turkana)* LAPSSET will bring economic development to Turkana county
2. Job creation (random selection among three conditions)	• *(Job_all)* Many new jobs will be created benefitting the people of Kenya, Ethiopia and South Sudan. **[Control]** • *(Job_Kenya)* Many new jobs will be created benefitting many Kenyans throughout the country. • *(Job_Turkana)* Many new jobs will be created benefitting many people of Turkana.
However, there are also negative impacts of LAPSSET.	
3. Limited resources and land (two conditions)	• *(Access_resources)* It is expected that there will be difficulty accessing pasture, water and several important sites. **[Control]** • *(Access_displacement)* There are high risks of displacement and restriction of pastoral movements due to land acquisition by the government of Kenya.
4. Environmental costs (two conditions)	• *(Environment_bio-diversity)* There are concerns regarding the destruction of bio-diversity such as vegetation. **[Control]** • *(LAPSSET's_environmental_damage)* There are some concerns regarding water and environmental pollution during the development phase.
5. Conflict risks (four conditions)	• *(Conflict_community)* Tensions between communities within Turkana County may arise over benefits in connection with LAPSSET such as jobs or tenders. **[Control]** • *(Conflict_elites)* Tensions between elites may arise over benefits connected with LAPSSET. • (*Conflict_between-government*) Tensions between the Governments of Kenya, South Sudan and Ethiopia may arise in connection with LAPSSET. • (*Conflict_cross-border inter-ethnic*) Conflicts between ethnic groups across the borders of South Sudan and Ethiopia may increase in connection with LAPSSET.

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(*Environment_pollution*)'. Finally, the factor Conflict risks has four alternatives, including 'tensions between communities within Turkana County (*Conflict_community*)', 'tensions between elites (*Conflict_elites*)', 'tensions between the three governments (*Conflict_between-government*)', and 'inter-ethnic conflicts among pastoral communities across country borders (*Conflict_cross-border inter-ethnic*)'.

The information vignette, thus, presents a combination of randomly chosen alternatives for five factors. Each vignette is randomly selected from 144 (= 3 × 3 × 2 × 2 × 4) possible combinations of the five factors. Table II provides an example script if each controlled condition was randomly selected for all five factors. A script includes a common prompt and five components, whose value is randomly selected from multiple alternatives.

Note that all factors, positive and negative consequences of LAPSSET, were presented simultaneously. For example, in any informational vignette, the negative environmental risks from the LAPSSET project were included, although the type of environmental consequence varied between the two alternatives. Some respondents were primed about 'the destruction of bio-diversity such as vegetation *(Environment_bio-diversity)*', which is the baseline category, while others were primed about 'water and environmental pollution during the development phase *(LAPSSET's_environmental_damage).*' In addition, each informational vignette also presents the negative consequences on their livelihoods, whether that is 'difficulty accessing pasture, water, and several important sites *(Access_resources)*', which are essential to pastoralists, or 'the risks of displacement and restriction of pastoral movements due to the land acquisition by the government of Kenya *(Access_displacement).*' Together with information on environmental costs and damages to pastoralists' livelihoods, the information on expected economic benefits was primed. It explicitly primes about economic development while varying the information on the beneficiaries and also about the job creation effects of LAPSSET. The

Table II. Example of an experimental vignette.

Now I am going to ask your opinions on LAPSSET (road, rail and pipeline), which stands for Lamu Port, South Sudan, Ethiopia Transport Corridor.
***
There are several positive impacts of LAPSSET.
[LAPPSET will bring economic development to Kenya, Ethiopia and South Sudan.] [Many new jobs will be created benefitting the people of Kenya, Ethiopia and South Sudan.].
However, there are also negative impacts of LAPSSET.
[It is expected that there will be difficulty accessing pasture, water and several important sites.] [There are concerns regarding the destruction of bio-diversity such as vegetation.] [Tensions between communities within Turkana County may arise over benefits in connection with LAPSSET such as jobs or tenders.]

Notes: The commonly given introduction and prompt are italicised; for each […], one out of multiple possible alternatives is randomly selected for each factor. *** Indicates identifier questions including 'Have you heard of the LAPSSET project before?' and 'Do you know where the LAPSSET route is going to pass? Tell of all routes that you know' which was asked if the respondent indicated having heard of LAPSSET.

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information on the beneficiaries also varies among 'Kenya, Ethiopia, and South Sudan', 'across Kenya' and 'only Turkana'.

As discussed earlier, Turkana County has been highly prone to various types of conflicts, including inter-communal conflict, which is both culturally driven and survival-based, and is exacerbated by competition over resources essential to pastoralism, such as pasture and water sources, and loss of cattle through raids, drought or disease, which prompts raids in order to restock. Qualitative studies have shown evidence of increased risks of certain types of conflict during the economic development phase in Turkana due to oil discovery. Conflicts include localised tensions between the local community and foreign investors over the distribution of benefits (*Conflict_community*); tensions between elites over various opportunities and benefits (*Conflict_elites*); tensions between the governments of Kenya, South Sudan and Ethiopia (*Conflict_between_government*); and conflicts between the people of Turkana and neighbouring ethnic communities, such as the Pokot, in the bordering county of West Pokot (*Conflict_cross-border inter-ethnic*).

We anticipate that the LAPSSET project may escalate existing conflicts (Mkutu 2022) and give rise to new types of conflict. Among various conflict risks, we carefully selected four categories to balance the number of conflict categories and statistical power. We prioritised categories that (a) have a wide impact on Turkana residents and (b) are connected to LAPSSET.

First, one of the common, existing, and potential conflicts and tensions associated with LAPSSET is a broad category directly involving local residents: 'Tensions between communities within Turkana County related to LAPSSET benefits, such as jobs or tenders (*Conflict_community*).' As discussed earlier, numerous conflicts occur along county borders, especially along the Turkana–Pokot border. We expected that existing inter-ethnic conflicts, like the Turkana–Pokot conflict along the Turkana-West Pokot border, would fall under this category for residents living near the Turkana side of the county border. Essentially, competition for LAPSSET-related economic opportunities could exacerbate inter-ethnic tensions along county borders, affecting people within Turkana County living near these borders.

The 'tensions between elites (*Conflict_elites*)' and 'tensions between the Governments of Kenya, South Sudan, and Ethiopia (*Conflict_between-government*)' are also expected results of LAPSSET (Mkutu 2022); therefore, we have included these categories as well.

Additionally, we included the category 'conflicts between ethnic groups along the borders with South Sudan and Ethiopia (*Conflict_cross-border inter-ethnic*)' because we considered conflicts between ethnic groups along the South Sudan-Ethiopia borders highly relevant due to LAPSSET's routes. Originally planned to pass through Baringo County in 2017, the LAPSSET project now bypasses Turkana County entirely in its 2019 route, potentially causing tensions and conflicts. The new route goes north of Samburu County, enters Turkana County, reaches Baragoi town in Samburu, and continues to Lokichar before heading northward to Nadapal on the South Sudan border, where conflicts involving South Sudan and Ugandan groups have become highly relevant.

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Results

Data

A total of 801 respondents gave informed consent and participated in the survey. We oversampled female residents (69.8%) compared to the female population proportion in the Turkana County Statistical Abstract (48.06%), possibly due to male adults being at work during our survey times. Our age distribution is more representative than the Turkana population data, as seen in Table A1 in the Online Appendix. We later adjust our estimation results using survey weights to make the sample more representative of gender and age distributions.

Tables A2-1 through A2-14 in the Online Appendix provide balanced statistics on a series of pre-treatment variables between two pairs of alternatives for all five factors to check whether the randomisation was performed accurately in our experiment. The balance between different treatment conditions was achieved fairly well, except in a few cases, particularly with the conflict-type attribute, which has four components.

Despite initially achieving a statistical balance in treatment assignments for all survey participants, only 311 respondents ended up participating in the experiment due to non-random reasons. First, due to attrition, only 761 respondents were asked about their awareness of the LAPSSET project. Second, out of the initial 761 respondents, 311 (40.87%) were aware of LAPSSET and participated in the experiment. Among these, 13.18% failed to identify any routes correctly, 21.54% said they did not know, and 65.27% correctly identified at least one route (see Table III). Later, we will examine whether the non-random participation in the experiment biases our findings.

Table III. Frequency of exposure to information about LAPSSET.

a. Responses to the question 'Have you heard of LAPSSET before?'

Response	Frequency	Per Cent	Cumulative Per Cent
No	450	59.13 (54.04)	59.13 (54.04)
Yes	311	40.87 (45.96)	100 (100)
Total	761	100 (100)	

b. Identifying the routes of LAPSSET correctly.

Response	Frequency	Per Cent	Cumulative Per Cent
None	41	13.18 (13.28)	13.18 (13.28)
Only one route correct	111	35.69 (38.47)	48.87 (51.75)
More than two routes correct	92	29.58 (29.62)	78.46 (81.37)
I don't know	67	21.54 (18.63)	100 (100)
Total	311	100 (100)	

Note: Weighted percentages using survey weights are presented in parentheses.

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Estimation results

Before presenting the relative effects of each component on our respondents' support for LAPSSET, we first outline the overall support level for LAPSSET among our respondents in Table IV. The support level is measured using a five-point scale ranging from 'strongly oppose' to 'strongly support' in response to the question, 'Do you support or oppose LAPSSET?'

Among our respondents, 73% support LAPSSET, with 52.9% strongly supporting it and 20.3% somewhat supporting it, whereas 23.9% do not support it, with 8.71% expressing neutrality, 11% somewhat opposing it and 4.2% strongly opposing it. When survey weights are used to adjust for gender and age, 75% of respondents support LAPSSET, while 23% do not.

In Table V, we present the average treatment effects (ATE) of priming different aspects of LAPSSET on overall support for LAPSSET in the total (Column 1), female (Column 2), and male (Column 3) samples, respectively. An ordinary least-squares (OLS) model was used to estimate the ATEs. The constant estimates (4.435, 4.512 and 4.272 for the total, female, and male samples, respectively) indicate that the predicted support level for LAPSSET falls between 'support somewhat' and 'strongly support', regardless of gender. This implies that Turkana respondents who are aware of LAPSSET support it even after considering its various consequences, both positive and negative. Our respondents, thus, view the economic development project's overall impact as positive despite significant concerns about its environmental costs and conflict risks.

When interpreting the results, it is important to note that a statistically insignificant ATE for a specific benefit or cost does not reflect the overall opinion of respondents towards LAPSSET, whether positive or negative. Each ATE should be viewed in comparison to the baseline category. For example, an ATE related to the impact of water and environmental pollution with a statistically insignificant estimate indicates that support levels for LAPSSET remain unaffected by different environmental costs. In other words, despite various types of environmental damage, respondents generally expressed support for LAPSSET, ranging from 'Support Somewhat' to 'Support Strongly.' This trend was consistently observed across all samples: the total sample, male-only, and female-only.

Several factors affected support for LAPSSET. First, the information on job creation benefits in Kenya (*Job_Kenya*) and Turkana County (*Job_Turkana*) decreased respondents' support for LAPSSET compared to the information on benefits across the three countries (*Job_all*) among female respondents, with ATE values of −0.532 (p-value < 0.05) for 'many Kenyans throughout the country' (*Job_Kenya*) and −0.776 (p-value < 0.01) for 'many people of Turkana' (*Job_Turkana*). In contrast, male respondents showed a positive but statistically insignificant ATE for *Job_Kenya* and *Job_Turkana*. Overall, female respondents may prefer broader economic benefits across the three countries, while male respondents may not.

Second, inter-ethnic conflicts crossing borders (*Conflict_cross-border inter-ethnic*) decrease support for LAPSSET by −0.462 (p-value < 0.05) relative to

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Table IV. Respondents' level of support for LAPSSET.

Response	Frequency	Per Cent	Cumulative Per Cent	Response	Frequency	Per Cent	Cumulative Per Cent
Strongly support (1)	164	52.9 (55.48)	52.9	Support	227	73.2 (75.15)	73.2
Support somewhat (2)	63	20.32 (19.67)	73.23				
Neutral (3)	27	8.71 (8.67)	81.94	Do not support	74	23.9 (22.57)	97.1
Oppose somewhat (4)	34	10.97 (10.53)	92.9				
Strongly oppose (5)	13	4.19 (3.37)	97.1				
I Don't Know	9	2.9 (2.27)	100	I Don't Know	9	2.9 (2.27)	100
Total	310	100			310	100	

Note: Weighted percentages using survey weights are presented in parentheses.

Table V. Average treatment effects (ATEs) on the level of support for LAPSSET.

Variables	(1) Total	(2) Female	(3) Male
1. *Development_Kenya*	−0.098	−0.251	−0.048
	(0.165)	(0.261)	(0.200)
1. *Development_Turkana*	−0.182	0.126	−0.348
	(0.182)	(0.254)	(0.273)
2. *Job_Kenya*	0.044	−0.532**	0.210
	(0.168)	(0.242)	(0.234)
2. *Job_Turkana*	−0.164	−0.776***	0.049
	(0.180)	(0.246)	(0.249)
3. *Access_Displacement*	0.099	−0.094	0.312
	(0.146)	(0.200)	(0.214)
4. *Environment_Pollution*	−0.169	0.018	−0.189
	(0.142)	(0.205)	(0.193)
5. *Conflict_Elites*	−0.100	0.034	0.337
	(0.195)	(0.279)	(0.283)
5. *Conflict_Between Government*	0.130	0.324	0.118
	(0.177)	(0.249)	(0.278)
5. *Conflict_Cross Border Inter-Ethnic*	−0.462**	−0.466	−0.290
	(0.212)	(0.317)	(0.315)
Constant	4.435***	4.512***	4.272***
	(0.222)	(0.281)	(0.335)
Observations	301	143	119
Adjusted R^2	0.024	0.067	0.017

Notes: Survey weights are used; robust standard errors are used; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The baseline category for each factor is as follows: *Development_all* for the 'Development' factor, *Job_all* for the 'Job' factor, *Access_resources* for the 'Access' factor, *Environment_bio-diversity* for the 'Environment' factor, and *Conflict_community* for the 'Conflict' factor.

priming about the risks of tension between communities within Turkana County (*Conflict_community*) in the total sample, without significant difference between female and male sub-samples. Perhaps because cross-border inter-ethnic conflicts are more violent and damaging than tensions within Turkana County, support for LAPSSET decreased due to the expectation of greater conflict damage. However, even with this decrease, respondents still somewhat support LAPSSET when primed about cross-border, inter-ethnic conflicts (4.435–0.462 = 3.973).

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Overall, our respondents from Turkana County prioritise economic development at the expense of environmental degradation and conflict risks. This aligns with previous findings that people in developing nations tend to prioritise economic growth over environmental and security concerns. Females expressed less support for LAPSSET when job benefits are localised, unlike male respondents whose support remained unaffected by varying distributions of job creation effects.

Access to information and support for LAPSSET

Given that over half of our experiment's participants are unfamiliar with LAPSSET and that over a third of those aware of LAPSSET are unable to identify information about it accurately, concerns arise about potential sampling bias influencing support for the project. Factors such as respondents' household location (urban or rural), constituencies and socio-demographic characteristics (gender, age, education level, ethnicity and primary language spoken at home) are suspected to influence their social networks and perceptions of LAPSSET. Access to information, determined by ownership of a radio or TV, may also impact exposure and resulting attitudes. Thus, we conducted two-sample *T*-tests on these variables, comparing those aware of LAPSSET with those who were not. Detailed analysis can be found in Table A3 in the Online Appendix.

Significant differences were found between the two groups based on gender, education level, media ownership, location (Loima or Turkana East), ethnicity (Turkana vs. non-Turkana), and interview language (Swahili only or Turkana most). Among survey participants, 21% of those unaware of LAPSSET were male, compared to 52% of those informed being male, indicating a greater gender imbalance among the uninformed. The average education level of those unaware of LAPSSET was 4.67 (between Standard 3 and 4) compared to 8 (Standard 7) for the informed. Ownership of radio and TV among those informed was 33% and 25%, respectively, while among the uninformed, it was 20% and 11%, respectively. Turkana East residents were more likely to have heard of LAPSSET (26%) than those in Loima (1.9%). Non-Turkana respondents comprised 5.4% of the sample.

In the Online Appendix, we addressed potential sampling bias impacting our main findings. By including factors related to exposure to LAPSSET information as control variables in regression analyses in Table A4 (Columns (1)), we examined their influence on LAPSSET support. Among the factors showing significant distributional differences between those aware and unaware of LAPSSET – gender, education, asset ownership of radios or TVs (Asset_radio, Asset_tv), residency in Loima and Turkana East (Turkana Loima, Turkana East), ethnicity (Non-Turkana) and interview language – none showed statistically significant effects on support for LAPSSET. However, when these factors interact with treatment variables, several treatment variables statistically significantly affected respondents' average support level for LAPSSET at the 95% confidence level in certain sub-groups. See Columns (2) through (11) in Table A4 of the Online Appendix for the estimation results when interaction terms are included.

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In Column (2), we examined how gender influenced reactions to different treatment information. The results showed significant gender differences in support for LAPSSET due to job creation. Information about job creation in Kenya (−0.532, $p < 0.05$) and Turkana (−0.776, $p < 0.05$) decreased support among females, suggesting their concern about job creation disparities, while the same information increased support among males more than females (0.864 for *Job_Kenya* at $p < 0.01$ and 0.889 for *Job_Turkana* at $p < 0.05$). For respondents without any education (Column (3)), information about displacement decreased support for LAPSSET (−0.647 for *Access_displacement*, $p < 0.05$), while the size of the decrease reduced as more education was received. Among those without a radio (Column (4)) or TV (Column (5)), information about inter-ethnic conflict risks decreased support by 0.563 and 0.587, respectively ($p < 0.05$). Turkana East residents showed decreased support (−0.761, $p < 0.05$) when informed about development in Kenya alone (Column (6)). In Loima, support for LAPSSET decreased substantially with information about localised benefits or risks, particularly job creation effects only in Kenya (−2.786, $p < 0.01$) compared to multiple countries (Column (7)).

Those who are not ethnically Turkana (Column (8)) decreased support for LAPSSET when they heard about potential inter-ethnic cross-border conflict relative to hearing about communal conflict (−0.445, $p < 0.05$) and also when hearing about localised economic development only in Kenya (−1.720, $p < 0.01$), while their support increased when the job creation effect was concentrated on Turkana (1.079, $p < 0.01$). If these people are migrants to Turkana for economic opportunities, they may prefer broader economic development benefits for their home community in case they later go back, while preferring localised job benefits that primarily benefit themselves.

Even after conducting a series of conditional analyses, our key conclusion remains that Turkana public attitudes towards LAPSSET remained consistent across most sub-groups we considered, even in the presence of various environmental and conflict risks. However, our conditional analyses also showed that different types of information about LAPSSET, whether related to development or job benefits or negative consequences, such as environmental degradation, displacement and conflict risks, may have different influences on support for LAPSSET depending on the respondents' group characteristics.

Information accuracy and support for LAPSSET

We suspect that access to accurate information, rather than just information about LAPSSET, can influence respondents' perceptions. Biased information about the project's benefits or costs can skew perceptions, depending on the presented positive or negative effects. To address potential bias in our findings, we have used three empirical strategies to gauge the accuracy of information about LAPSSET.

The first strategy divides respondents into two groups: those who correctly identified the LAPSSET route and those who did not. Analysis in Column (1) (see Table A5 in the Online Appendix) shows that accurate information about LAPSSET somewhat influences overall support. Those who correctly identified

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a route were less supportive of LAPSSET than those who could not, though the difference was statistically insignificant. However, those unable to identify any route responded negatively to elite-level tensions (i.e. *Conflict_elites*) and cross-border inter-ethnic conflict (i.e. *Conflict_cross-border inter-ethnic*), decreasing support by 0.924 ($p < 0.01$) and 0.786 ($p < 0.05$), respectively. Conversely, those who correctly identified a route responded positively to information about elite-level conflict risks by 1.266 ($p < 0.01$) (i.e. *Conflict_elites* × Correct) compared to those given baseline information about community conflict.

The second approach divides the sample into two groups: those who received government information (referred to as 'Lapsset_info_gov') about LAPSSET and those who did not. This division allows examination of whether there is a positive bias towards supporting LAPSSET among those contacted by the government. The Kenyan government may have incentives to selectively communicate with individuals who are more likely to benefit from LAPSSET economically but are less likely to face environmental and conflict risks. These individuals are more likely to support the government's pursuit of the project.

Table A5's Column (2) in the Online Appendix shows that government-provided information about LAPSSET did not significantly affect overall support for the project. Individuals who received this information responded similarly to those who did not. Thus, the strong support for LAPSSET among Turkana residents is unlikely due to selective government information.

The third approach divided respondents into two groups: those aware of the negative consequences of LAPSSET (Know_Any_Harm) and those unaware, as shown in Column (3) of Table A5 in the Online Appendix. There was no significant difference in LAPSSET support between the groups. However, individuals aware of negative impacts were more supportive of LAPSSET when informed about government distributional conflicts (*Conflict_between government* × Know_Any_Harm) than community conflicts by 0.772 ($p < 0.05$). Conversely, those unaware of negative impacts decreased their support for LAPSSET by −0.771 ($p < 0.01$) when informed about potential inter-ethnic conflicts (*Conflict_cross-border inter-ethnic*) compared to community conflicts. This suggests that better-informed individuals perceive lower risks of inter-ethnic conflict, affecting their response to such priming.

In summary, additional analyses show consistently strong support for the LAPSSET among Turkana residents despite controlling for and conditional on different indicators of information access and accuracy. While responses varied regarding priming on job creation, development and conflicts, there is no overall opposition to LAPSSET despite anticipated negative impacts on pastoralists' livelihoods.

Other potential sources of bias

Potential biases in our findings may arise from respondent fear or distrust, especially if they lack confidence in interviewers. To address this, we used native Turkana interviewers fluent in Turkana, Swahili and English. Although 94% of respondents spoke Turkana, language variations were noted

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during interviews. Supplementary analyses in Columns (9)–(11) in Table A4 of the Online Appendix show that overall support for LAPSSET among Turkana respondents remains high across interview languages, with the main results aligning closely with those of respondents who used Turkana exclusively. There was no evidence of fear or distrust influencing our main findings: while those who used Swahili exclusively showed significantly less support for LAPSSET by 1.111 ($p < 0.05$), indicating possible distrust, they did not respond differently to treatment conditions compared to the baseline category.

Conclusions

In developing nations, do residents support economic development despite potential negative impacts such as environmental degradation? Previous studies on public opinion regarding the environment's role in development have shown mixed findings (Dunlap *et al.* 1993; Bloom 1995; Dunlap & Mertig 1995; Inglehart 1995; Leiserowitz 2007; Dunlap & York 2008; Sandvik 2008; Kvaloy *et al.* 2012; Kim & Lee 2020). However, the relationship between the perception of economic development and environmental degradation is likely confounded by multiple factors, leading to inconsistent findings. This study has examined public opinion on a large-scale development project in a developing country by focusing on the attitudes of Turkana County residents towards the LAPSSET corridor project, a collaborative effort between Kenya, South Sudan and Ethiopia. The study has considered multiple factors affecting perceptions of development, such as economic benefits, environmental damage and resulting conflict risks, to explore how Turkana County residents perceive the project's economic benefits in comparison to its environmental costs and conflict risks (Kim & Mkutu 2021).

Using a factorial experiment, we have aimed to identify the individual impacts of various project components. The experiment was part of a broader public opinion survey across all six constituencies in Turkana County, conducted in November–December 2020. We have found that despite potential environmental costs and conflict risks, Turkana County residents support the LAPSSET corridor project. Even after learning about the risks, their support remained high, indicating a strong tolerance for the negative consequences of economic development.

We have conducted additional analyses to investigate whether high support for LAPSSET among Turkana residents has been affected by sampling bias, potentially excluding those with minimal knowledge about LAPSSET. High support has remained consistent across all sub-samples, with no overall opposition due to environmental damages or security concerns. This aligns with previous findings that residents in developing countries tolerate environmental degradation for economic gains more than those in developed countries. Having been marginalised, Turkana residents may be prone to positive responses about LAPSSET, driven by a desire for LAPSSET benefits.

Our study has demonstrated a positive overall sentiment towards the LAPSSET project among respondents in Turkana. However, it has also revealed limited participatory processes, raising concerns about local resentment and

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tension. In particular, less than 40% of respondents were aware of the project, with only around 42% receiving government information and about 20% providing input, indicating weak local participation. Given that previous studies have attributed the lack of involvement to potential protests and instability (Johannes *et al.* 2015; Schilling *et al.* 2015, 2018; Agade 2017), our findings about general support do not mean that communities most affected share the same sentiment. The economic benefits of LAPSSET are promising, but studies show uneven distribution, environmental risks and conflict potential (Aalders *et al.* 2021; Lind 2021; Mkutu 2022). That is, it is important to acknowledge significant differences in the perception of LAPSSET based on how affected communities are, and the importance of participatory processes is crucial to prevent sacrificing the welfare of a marginalised and conflict-prone county for Kenya's broader economic gain.

Supplementary Material. The supplementary material for this article can be found at https://doi.org/10.1017/S0022278X24000387.

Competing Interests. None.

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