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Public acceptance of policies to reduce forest loss: Evidence from a large-N cross-national survey in East Africa

Aloyce Hepelwa [a], Peter Babyenda [b], Michael Ndwiga [c], Matilda Ntiyakunze [d], Boscow Okumu [e], Hailemariam Teklewold [h], Jesper Stage [f], Daniel Slunge [g,*]

[a] University of Dar es Salaam, Department of Agricultural Economics and Business, P.O.Box 35094, Dar es Salaam, Tanzania
[b] Makerere University, Department of Policy and Development Economics, P.O. Box 7062, Kampala, Uganda
[c] University of Nairobi, Department of Economics and Development Studies, Box 30197-00100, Nairobi, Kenya
[d] Ardhi University, Institute of Human Settlements Studies, 35176, Dar es Salaam, Tanzania
[e] The National Treasury, Harambee Avenue, P. O. Box 30007-00100, Nairobi, Kenya, Environment for Development (EfD) Centre, Department of Economics and Development Studies, University of Nairobi, Kenya
[f] Luleå University of Technology, Department of Social Sciences, Technology and Arts, 971 87 Luleå, Sweden
[g] University of Gothenburg, Environment for Development, Box 645, 405 30 Gothenburg, Sweden
[h] Deceased, Policy Studies Institute (PSI), P.O.Box :2479, Addis Ababa, Ethiopia

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ABSTRACT

While environmental policy acceptance has been extensively studied in OECD contexts, comparative evidence on how different forest policy instruments are perceived across low- and middle-income countries remains limited, particularly regarding the interaction between individual attitudes and national governance conditions. This study addresses this gap by analyzing stated support of four policies aimed at reducing forest loss across five East African countries: Ethiopia, Kenya, Rwanda, Tanzania, and Uganda. Using survey data from 4542 respondents, we examine individual and contextual factors associated with acceptance.

At the individual level, acceptance is higher for bans and taxes on tree cutting on public lands (67–68%) than on charcoal (44–46%), suggesting that policies perceived to directly constrain household energy access face greater resistance than restrictions on tree cutting. Reliance on firewood or charcoal is negatively associated with acceptance of all policies, while environmental concern, education, and trust are positively associated. Access to clean cooking fuels is positively linked to acceptance of tree-cutting restrictions. However, households dependent on charcoal are less supportive of charcoal-related bans and taxes, even where cleaner cooking alternatives are more available. Government effectiveness is associated with higher policy acceptance primarily where trust in government is high. Tree-cover loss is positively associated with acceptance of charcoal-related measures, and environmental concern is more strongly associated with acceptance in countries experiencing greater degradation.

While the sample is skewed toward urban and more educated respondents, the regional comparative analysis offers new evidence on how socio-economic and contextual factors relate to public acceptance of forest policies.

1. Introduction

The loss and degradation of tropical forests continue at alarming rates, despite their critical importance for livelihoods, biodiversity, and carbon storage (Vancutsem et al., 2021; Bourgoin et al., 2024). Protecting the world's remaining forests is a global priority, but the responsibility for conservation lies primarily with national policies. Over recent decades, governments worldwide have adopted various forest governance strategies, ranging from command-and-control measures to payment-based incentives and hybrid approaches (Börner et al., 2020; Wunder et al., 2020). While national policies can significantly reduce deforestation and degradation (Wuepper et al., 2024), their effectiveness largely depends on the interplay with institutional arrangements at different governance levels (Börner et al., 2020). Ostrom (1990, 1998, 2005) emphasizes that effective forest governance rarely relies solely on either top-down regulation or bottom-up self-organization. Rather,

* Corresponding author.
E-mail address: daniel.slunge@gu.se (D. Slunge).

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trust-based local institutions and polycentric governance arrangements, where national rules interact with and are reinforced by local institutional practices, are crucial for sustainably managing common-pool resources such as forests.

Research in OECD countries has demonstrated that public acceptance is key to the successful implementation of forest policies (Cubbage et al., 2007; Jones et al., 2012; Lonkila et al., 2025), and that trust in implementing authorities and the perceived fairness and effectiveness of environmental policies are well-documented determinants of public acceptance (Bergquist et al., 2022; Davidovic and Harring, 2020; Hajjar and Kozak, 2015; Valkeapää and Karppinen, 2013; Bergseng and Vatn, 2009). However, it is unclear whether these factors are similarly associated with public acceptance of forest conservation policies in East African countries, which is the geographical focus of this study.

Public acceptance may be especially critical to the success of forest conservation policies in countries where a large share of the population is dependent on fuelwood, charcoal and other forest resources for their livelihoods. Policies that fail to account for these dependencies, such as outright bans, often face opposition due to their economic impact on livelihoods (Bluffstone et al., 2014). When communities lack alternative livelihood options, bans and other forest use restrictions impose costly constraints (Dasgupta, 1996), leading to opposition from forest-dependent populations. Similarly, price-based instruments like fees and royalties may encounter resistance if revenues generated are not transparently reinvested into forest management, benefitting local communities. Evidence from related fields such as carbon taxation shows that public support for price-based environmental policies increases when revenues are transparently recycled for environmental or social purposes (Mohammadzadeh Valencia et al., 2024).

Understanding the conditions under which forest policies gain or lose public support is thus critical for designing more effective conservation strategies. This is particularly relevant for policies that impose short-term economic costs on individuals or communities, while promising long-term collective benefits. In many low- and middle-income countries experiencing rapid forest loss and degradation, formal institutions and capacities for managing forests and coordinating intersectoral pressures on resources are often limited (Börner et al., 2020; Seymour and Harris, 2019).

The purpose of this paper is to examine public acceptance of four specific forest conservation policy instruments in five East African countries: Ethiopia, Kenya, Rwanda, Tanzania, and Uganda. Specifically, we analyze stated support for bans and taxes on tree cutting on public lands and for bans and taxes on charcoal production and use. In this paper, acceptance is operationalised as stated support for each policy instrument. Drawing on data from a large-scale population survey, we assess how individual-level factors, such as resource dependence, environmental concern, education, and trust, are associated with stated support for each of these four policy instruments, and how these associations vary across national structural and governance contexts. Section 2.1 presents the conceptual framework and hypotheses guiding our analysis, linking these categories to established theories of policy acceptance and collective action, and situating them within the East African context.

The five countries in focus have all experienced forest loss and degradation to various degrees, but differ in their policy responses, reflecting differences in governance structures, enforcement capacities, and socio-economic conditions. A major driver of forest loss and degradation in the region is the widespread reliance on firewood and charcoal for household energy, especially in rural and peri-urban areas. In 2020 only about 20% of the East African population had access to alternative energy sources for cooking (Bartlett et al., 2024). In response, governments in East Africa have introduced a variety of policy instruments aimed at curbing unsustainable forest use.

While charcoal production is a major driver of forest degradation, policies targeting charcoal often have more immediate and visible implications for household energy use and livelihoods than restrictions on tree cutting on public lands.

Bans and taxes on tree cutting and charcoal use have been introduced to varying degrees across the five East African countries, but have often met strong resistance due to their perceived negative impacts on livelihoods, limited energy access, and conflicts with vested interests (Bartlett et al., 2024; Wekesa et al., 2023; Branch and Martiniello, 2018;; Sander et al., 2013). For example, the charcoal bans in Tanzania in 2006 and 2017 were both short-lived due to strong resistance from consumers and traders (Doggart et al., 2020; Sander et al., 2013). In Kenya, a 2018 logging moratorium and restrictions on charcoal transport led to price hikes and illegal imports from neighboring countries (Bartlett et al., 2024; Wekesa et al., 2023) (see Supplementary Information S1 for further detail).

In summary, our analysis reveals that public acceptance of forest conservation policies in East Africa varies systematically across policy types and countries. Acceptance is higher for bans and taxes on tree cutting on public lands than for measures restricting charcoal production and use, reflecting the strong livelihood dependence on biomass energy. Across all countries, environmental concern, education, and interpersonal trust are positively associated with acceptance, while reliance on firewood and charcoal reduces support. Institutional trust shows a more complex pattern, with its effect depending on government effectiveness. Together, these results point to the importance of individual motivations, attitudinal orientations, and institutional contexts for understanding public acceptance of forest conservation policies.

By analyzing levels of public acceptance and their determinants in five East African countries, this study complements earlier research on forest policy acceptance in Africa, which have mostly relied on single-country analyses or smaller-scale case studies. It also contributes to the broader literature on environmental policy attitudes, which has largely focused on OECD countries. The findings are relevant not only for academic understanding but also for the design of forest policies in East Africa that can gain broad public acceptance.

2. Methodology and data

2.1. Conceptual framework

Building on the extensive literature on environmental policy acceptance (e.g. Drews and van den Bergh, 2016; Ejelöv and Nilsson, 2020; Sandström et al., 2020; Bergquist et al., 2022), we conceptualize three main groups of factors influencing public acceptance of forest conservation policies: self-interest motives, internal factors, and interrelational factors, complemented by socio-demographic characteristics. These categories capture both individual-level motivations and broader social dynamics that shape attitudes toward environmental governance.

Self-interest motives reflect individuals' dependency on the regulated resource and their perceived personal costs or benefits of specific policy measures. Individuals who rely heavily on firewood or charcoal for their livelihoods are likely to view bans or taxes on these resources as costly economic constraints, reducing their acceptance of such policies (Dasgupta, 1996; Jumbe and Angelsen, 2007; Ohmura and Creutzburg, 2021). Conversely, individuals less dependent on these resources may perceive greater net benefits from conservation measures that ensure sustainable forest management. These expectations align with rational-choice perspectives emphasizing cost–benefit evaluations in shaping policy preferences.

Internal factors encompass environmental concern and ideological positions that reflect underlying values and worldviews. Prior research shows that self-transcendent values, which emphasize altruism, social justice, and environmental stewardship, are associated with higher acceptance of climate and environmental policies. In contrast, self-enhancing values, which prioritize social power, wealth, ambition and influence, are linked to lower levels of policy acceptance (Bergquist et al., 2022). Individuals with greater concern about environmental

issues are more likely to accept environmental policies, including those that impose regulatory constraints (Drews and van den Bergh, 2016; Ejelöv and Nilsson, 2020; Kim et al., 2024). Accordingly, we expect that greater concern about forest loss will be positively associated with acceptance of bans and taxes on charcoal and cutting trees on public lands (Baranzini et al., 2010; Jones et al., 2012).

Inter-relational factors relate to social capital (Putnam, 2000), particularly inter-personal and institutional trust, which are critical for enabling cooperation and compliance in collective environmental action. Empirical studies have shown that both forms of trust are positively associated with acceptance of environmental, climate and conservation policies (Davidovic and Harring, 2020; Bergquist et al., 2022; Jones et al., 2012; Behera, 2009; Kairu et al., 2024; Ma et al., 2025; Niedziałkowski et al., 2025). Trust also plays a central role in facilitating collective action, both within communities managing shared resources and in broader governance settings where citizens' trust in institutions and in others is essential for compliance with public policies and cooperation (Ostrom, 1990, 1998, 2005). We therefore expect both interpersonal and institutional trust to be positively associated with acceptance of forest conservation policies, although this relationship may be weaker in contexts characterized by high corruption or weak institutional performance.

In addition to these three groups of core factors, we also consider the role of *socio-demographic variables*, including income, place of residence, education level, age, and gender, on policy acceptance (Baranzini et al., 2010; Jones et al., 2012). While these factors often have a smaller impact compared to material, internal, and inter-relational factors, they provide valuable context for understanding heterogeneity in public attitudes (Bergquist et al., 2022). For instance, income has been found to correlate with a greater willingness to contribute to forest conservation policies (Abdeta et al., 2023). Additionally, higher income is often associated with greater educational attainment, which in turn has been linked to increased environmental awareness and concern (Serbruyns and Luyssaert, 2006; Dolisca et al., 2007; Monroe et al., 2019). Education not only increases knowledge of environmental issues but also serves as a process of norm socialization, exposing individuals to values that may influence their attitudes toward conservation policies (Pascarella and Terenzini, 1991).

Finally, we consider that cross-country differences in access to clean cooking fuels (representing the availability of alternative energy options), government effectiveness (representing institutional capacity), and rates of tree-cover loss (capturing the salience of deforestation and degradation) are likely to influence the acceptability of different forest policy instruments. We therefore include national-level measures of these factors. In general, we expect greater access to clean cooking fuels to be associated with higher acceptance of restrictive forest policies, insofar as households face lower private costs of shifting away from biomass (Doggart et al., 2020). We also expect higher government effectiveness to correlate with greater acceptance on average, given the link between institutional capacity, perceived implementation credibility, and policy support (Börner et al., 2020; Davidovic and Harring, 2020). Likewise, higher recent tree-cover loss may heighten perceived problem salience and thus acceptance (Bourgoin et al., 2024; Drews and van den Bergh, 2016). Because these contextual relationships plausibly depend on individual characteristics, we also examine cross-level interactions. Specifically, we test the relationships between clean-fuel access and household fuel dependence (charcoal or firewood), government effectiveness and trust in government, and tree-cover loss and environmental concern, to assess whether personal motivations and attitudes are conditioned by broader governance and environmental contexts (Ostrom, 2005; Wuepper et al., 2024).

2.2. Data collection

The study is based on survey data collected in the five East-African countries Ethiopia,Kenya, Rwanda,Tanzania and Uganda, and using a structured questionnaire (S2). A survey company based in Kenya was recruited to collect the data.[1] Initially, the questionnaire was scripted in English and then translated into the local languages spoken in the study countries, such as in Kenya Swahili and Somali; in Tanzania Swahili; in Uganda Luganda and Runyanoke; in Rwanda Kinyarwanda and French; and in Ethiopia Amharic, Tigrinya, Orommiffa and Somali. The translations were conducted by native speaking translators in the respective countries. The interviews were conducted by 26 experienced enumerators and 5 supervisors using Computer Assisted Telephone Interviews (CATI) and responses were recorded in the Kobo Toolbox software. Before conducting the interviews, the enumerators participated in a two-day training on the different topics covered in the questionnaire and various techniques for collecting data using the CATI method.

A pilot study was conducted in January 2022 with 1000 respondents, 200 from each of the five countries, to test the reliability and content validity of the questionnaire. Additionally, the pilot study assisted in refining the questionnaire with feedback from both the enumerators and respondents. The survey company recruited respondents in each country from its existing respondent databases. Quota-based screening was used to approximate adult population distributions by age, gender, and area of residence, but the sampling was not probability-based and did not employ stratified random sampling. The intended target sample was approximately 1000 complete responses per country, reflecting budgetary constraints while ensuring sufficient within-country variation for statistical analysis and cross-country comparison. Sample sizes were therefore designed to be broadly comparable across countries rather than proportional to national population size. We did not apply post-stratification weights.

In total 7622 respondents were contacted. After three reminders, a total of 4542 complete responses (60% response rate) were collected in March 2022 from the five countries as follows: Ethiopia 899, Kenya 917, Rwanda 972, Tanzania 884 and Uganda 870 responses. It took the respondents between 10 and 23 min to complete the survey, with a mean time of 16 min.

The final sample is representative of the population in terms of gender but contains a lower share of young (<30 years) and elderly (>50 years) respondents (see supplementary information, S3, for a comparison of the sample and population). The sample also contains a larger share of respondents with higher education and of residents in urban areas than the total population data. Hence, caution should be exercised when generalizing our results to the broader population.

2.3. Survey design and data description

To assess public acceptance of policy instruments aimed at reducing forest loss, respondents were asked for their opinions on four specific measures: (i) a ban on the production and sale of charcoal, (ii) a tax on charcoal production and sales, (iii) a ban on tree cutting on public lands, and (iv) a tax on tree cutting on public lands. Responses were recorded on a Likert scale from 1 (strongly against) to 5 (strongly in favor). In addition to the forest policy questions analyzed in this paper, the survey also included questions on opinions of policies to reduce fossil fuel use and plastic pollution. Results from the climate policy questions are presented in a separate paper (Harring et al., 2024).

The survey was designed to capture the individual and contextual factors discussed in section 2.1. *Self-interest motives* were assessed through questions on the frequency of firewood and charcoal use. These variables capture respondents' dependence on forest resources that may influence their policy preferences (Dasgupta, 1996; Jumbe and Angelsen, 2007). *Internal factors* were measured by stated levels of concern about forest loss (Baranzini et al., 2010; Jones et al., 2012). *Inter-*

[1] Research approval was received from the National Commission of Science, Technology and Innovation (NACOSTI) in Kenya, and the survey company possesses national research permits for each of the five focal countries. The study was not preregistered.

relational factors were assessed with questions on trust in other people and trust in public institutions, specifically the national government and the national environmental authority (Davidovic and Harring, 2020; Bergquist et al., 2022). Socio-demographic factors included income, place of residence (rural, peri-urban, or urban), education, age, and gender. Education was included in the main empirical model, while the other variables were used as controls.

The survey did not include a question on how revenues from forest-related fees or taxes would be used, which would have allowed examination of potential effects of revenue recycling.

The individual-level data were complemented with national-level indicators on access to clean cooking fuels, government effectiveness, and recent tree-cover loss, as described in Section 2.1.These indicators provide contextual measures of household energy access, institutional capacity, and environmental pressure across the five East African countries.

Access to clean cooking fuels reflects the share of the population using non-solid fuels for cooking and serves as a proxy for the availability of alternatives to biomass-based energy. Government effectiveness is a composite indicator capturing perceptions of the quality of public services, policy formulation and implementation, and the credibility of government commitments. Recent tree-cover loss is measured as the average annual percentage tree-cover loss during 2001–2021, expressed as a share of 2000 tree-cover area (Hansen et al., 2013), and is used as an indicator of recent tree-cover loss pressure. Throughout the paper, *forest loss* is used as a general term, while *tree-cover loss* refers specifically to the satellite-based indicator used in the empirical analysis.

Data were drawn from publicly available international datasets: *World Development Indicators* (World Bank, 2025a), *Worldwide Governance Indicators* (World Bank, 2025b), and the *Hansen/UMD/Google/USGS/NASA Global Forest Change Dataset* (Hansen et al., 2013). Definitions and measurements of all variables in the main model are summarized in Table 1, and additional socio-economic controls are provided in Supplementary Section S4.

Descriptive statistics of the variables in the main model are presented in Table 2 and for all variables, including the control variables age, income and place of residence in Supplementary S5. There is a relatively large share of the respondents reporting a high level of trust in the government (63%) and environmental authorities (59%). However, there are notable differences in the level of trust between the different countries, e.g. the share of respondents with a high trust in government is 28% in Kenya and 94% in Rwanda. The reported trust levels in Rwanda are extremely high and could be due to self-censorship in an authoritarian regime (Tannenberg, 2022). There is a considerably lower share of respondents (24%) reporting a high level of trust in other people. Also, here there are large country differences with 5% in Kenya and 46% in Tanzania reporting high trust.

There is generally a high level of concern for loss of forests with 68% of the respondents stating that they are "very concerned". The use of charcoal and firewood is frequent with 72% and 45% of the respondents using charcoal and firewood, every day or several times a week, respectively. Also, here there are large differences between the countries. Only among respondents in Ethiopia there is a higher share using firewood frequently (78%) than charcoal (56%).

The three country-level variables reveal notable differences among the five study countries. Access to clean cooking fuels is highest in Kenya and remains very limited in Uganda, reflecting disparities in energy transitions. Government effectiveness scores are highest for Rwanda and lowest for Ethiopia and Uganda. Tree-cover loss between 2000 and 2021 is most pronounced in Kenya, Tanzania, and Uganda, while Ethiopia and Rwanda have experienced lower relative loss rates.

2.4. Model specification and estimation strategy

Given the hierarchical structure of our data, individual respondents

Table 1
Variable description and measurement.

Variable	Description	Measurement
Cutting Tree Ban	Acceptance of ban on cutting trees in public and community forests	1 = strongly against, 2 = somewhat against, 3 = neither in favor or against, 4 = somewhat in favor 5 = strongly in favor
Cutting Tree Tax	Acceptance of a fee or tax for cutting trees in public and community forests	1 = strongly against, 2 = somewhat against, 3 = neither in favor or against, 4 = somewhat in favor 5 = strongly in favor
Charcoal Ban	Acceptance of a ban on selling and using charcoal	1 = strongly against, 2 = somewhat against, 3 = neither in favor or against, 4 = somewhat in favor 5 = strongly in favor
Charcoal Tax	Acceptance of a tax on producing, selling and using charcoal	1 = strongly against, 2 = somewhat against, 3 = neither in favor or against, 4 = somewhat in favor 5 = strongly in favor
Level of concern	Level of concern about loss of forest	1 = Very concerned 0 = Not at all concerned/ Slightly concerned/ Somewhat concerned
Trust in Government	Level of trust for the national/ central government	1 = A great deal /Quite a lot 0 = No or very little/ Little/ Neither a lot nor little
Trust in Environment	Level of trust in environmental authority	1 = A great deal /Quite a lot 0 = No or very little/ Little/ Neither a lot nor little
Trust in People	Level of trust in other people	1 = 8/9/10 0 = 1/2/3/4/5/6/7 where 10 is *Most people can be trusted* and 1 *Most people cannot be trusted*
Charcoal use	Frequency of use of charcoal for cooking	1 = Every day/Several times a week 0 = Once a month/Once every 6 months/Never
Firewood use	Frequency of use of firewood for cooking	1 = Every day/Several times a week 0 = Once a month/Once every 6 months/Never
Higher education	Educational level at university	1 = Studies at a university/ university college/Completed university/ university college/Completed post-graduate studies 0 = Not completed primary/ lower-secondary school/ Primary or lower secondary school/Upper-secondary school/Post-secondary education
Country level variables		
Clean cooking fuels	Share of households with access to clean fuels and technologies for cooking	% of households with access to clean fuels and technologies for cooking*
Government effectiveness	Composite indicator of institutional quality and policy implementation capacity	Indicator score from the Worldwide Governance Indicators (WGI) 2022, range − 2.5 (weak) to +2.5 (strong) **
Tree-cover loss	Tree cover loss as a share of 2000 tree-cover area, 2000–2021	Average annual % tree-cover loss 2001–2021(stand-replacement disturbance of trees ≥5 m tall) as a share of 2000 tree cover area**

Note: The "Measurement" column describes the response alternatives used in the survey and how each variable was coded in the analysis for each individual level variable in the main model. Trust in other people was measured on a 0–10 scale, while institutional trust variables were measured on five-point scales similar to those used in Afrobarometer surveys. All trust variables were recoded into binary indicators. For country-level variables, the measures are based on publicly

available data sources corresponding to or preceding the survey year (2022): *World Development Indicators (World Bank, 2025); **Worldwide Governance Indicators (World Bank, 2025); ***Hansen/UMD/Google/USGS/NASA (Hansen et al., 2013).

nested within countries, we employ multi-level mixed-effects ordered probit models as the primary analytical framework. This approach accounts for unobserved heterogeneity at the country level, incorporates contextual covariates, and allows explicit modeling of cross-level interactions that capture how national conditions moderate individual-level relationships. Let Y_{ij}^{*} denote the latent propensity of individual i in country j to accept a given forest policy instrument. The observed response Y_{ij} is recorded on a five-point Likert scale (1 = strongly against to 5 = strongly in favor), such that:

$$Y_{ij} = \mathrm{k} \text{ if } \mu_{(k-1)} < Y_{ij}^{*} \leq \mu_{k.}$$

where μ_k are estimated threshold parameters. The structural equation is specified as:

$$Y_{ij}^{*} = X_{ij}\beta + Z_j\gamma + \{X_{ij}Z_j\}\delta + \mathrm{u}_j + \varepsilon_{ij}$$

where X_{ij} is a vector of individual-level characteristics (self-interest, internal dispositions, trust, and socio-demographics), Z_j contains the country-level covariates, and $\mathrm{u}_j \sim \mathrm{N}(0, \sigma^2\_\mathrm{u})$ captures unobserved country-specific random effects. The idiosyncratic error term ε_{ij} is assumed standard normal.

To probe potential cross-level mechanisms, we include the following interactions:

Charcoal (or firewood) use × Clean fuels – to test whether access to energy substitutes mitigates self-interest opposition among charcoal users; Trust in government × Government effectiveness – to examine whether institutional trust translates into support where governments are more effective, and Concern × Tree-cover loss – to assess whether higher rates of forest loss amplifies the behavioral relevance of environmental concern.

For each policy instrument we estimate four nested models (i) including only the core explanatory variables; (ii) adding socio- demographic controls (age, income and place of residence); (iii) adding country-level covariates (clean fuels, government effectiveness and tree cover loss); and (iv) adding cross-level interactions to test whether the effects of individual-level factors vary across national contexts. The full models are presented in supplementary information (S6). All estimations are estimated in Stata 20 using the "meoprobit" command. Country-level random intercept variances are reported to assess the magnitude of between-country heterogeneity after controlling for contextual factors.

To ensure that our results are not sensitive to specific assumptions or data features, we conduct several robustness and sensitivity checks, described in detail in Section 3.3 and Supplementary S7 - S8.

3. Results

3.1. The level of public acceptance of policies to reduce forest loss

In Fig. 1, we present the full distribution of responses across the five response alternatives to the questions on public acceptance of the four policy measures. Looking at the whole regional sample we find that a majority of the respondents are somewhat or strongly in favor of a ban (68%) and a tax (67%) on tree cutting. There is a lower level of acceptance of a ban (46%) or tax (44%) on charcoal.

There are some notable differences between the five countries. In Rwanda there is a considerably larger share of the respondents stating that they are in favor of a ban (84%) and a tax (77%) on cutting trees, compared to the other countries where between 60 and 66% of the respondents state they are in favor of these instruments.

There is a relatively larger acceptance of a ban on charcoal in Tanzania (51%) and Kenya (49%) compared to the other three countries where the level of acceptance of a ban is 42–43%. The acceptance of a tax on charcoal is on par with the acceptance of a ban in Tanzania (52%) and Kenya (49%), but also in Uganda, 50% of the respondents state that they accept a tax on charcoal. In Ethiopia 40% accept a tax, while only 27% of the respondents in Rwanda accept a tax on charcoal.

In principle, the relative share of those that are "strongly against" and "somewhat against" could be important as those "strongly against" may be more likely to protest. Notably, the share of respondents stating that they are strongly against a policy measure is consistently higher in Tanzania and Kenya in comparison with the other three countries. So even if the acceptance of, for example, a ban on charcoal is largest in Tanzania, the large share stating they are strongly against the policy indicates that there may nonetheless be a strong opposition against the policy.

3.2. Factors associated with public acceptance of policy instruments to reduce forest loss in East Africa

Results for the regional sample from the multi-level mixed-effects ordered probit models are displayed in Table 3 and 4, with public acceptance of the four policy measures as the dependent variables.

Table 2
Descriptive Statistics.

	East Africa		Ethiopia		Kenya		Rwanda		Tanzania		Uganda	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Cutting Tree Ban	3.732	1.549	3.593	1.47	3.706	1.694	4.128	1.062	3.515	1.748	3.68	1.636
Cutting Tree Tax	3.73	1.482	3.641	1.346	3.683	1.684	3.952	1.192	3.572	1.685	3.785	1.429
Ban on Charcoal	3.037	1.57	2.979	1.4	3.192	1.747	2.837	1.368	3.198	1.74	2.994	1.541
Tax on Charcoal	3.002	1.576	2.943	1.38	3.16	1.761	2.536	1.304	3.193	1.749	3.223	1.539
Trust in Government	0.627	0.484	0.626	0.484	0.276	0.447	0.943	0.231	0.587	0.493	0.685	0.465
Trust in Environment	0.593	0.491	0.335	0.472	0.469	0.499	0.972	0.164	0.592	0.492	0.569	0.496
Trust in People	0.235	0.424	0.199	0.4	0.043	0.202	0.185	0.389	0.465	0.499	0.295	0.456
Level of Concern	0.681	0.466	0.606	0.489	0.721	0.449	0.806	0.396	0.55	0.498	0.709	0.454
Charcoal Use	0.712	0.453	0.532	0.499	0.501	0.5	0.797	0.402	0.825	0.38	0.914	0.281
Firewood use	0.419	0.493	0.786	0.41	0.363	0.481	0.105	0.307	0.548	0.498	0.317	0.466
Higher Education	0.48	0.5	0.283	0.45	0.722	0.448	0.655	0.475	0.337	0.473	0.377	0.485
Country level variables												
Clean Fuels	–	–	8.8	–	30	–	8.3	–	9.2	–	0.6	–
Government Effectiveness	–	–	−0.79	–	−0.33	–	+0.23	–	−0.46	–	−0.61	–
Tree Cover Loss	–	–	3.7	–	11	–	8.2	–	12	–	11	–
Observations	4542		899		917		972		884		870	

Note: Country-level variables are based on 2022 national averages. Standard deviations and East Africa aggregates are not reported because these indicators are not respondent-based.

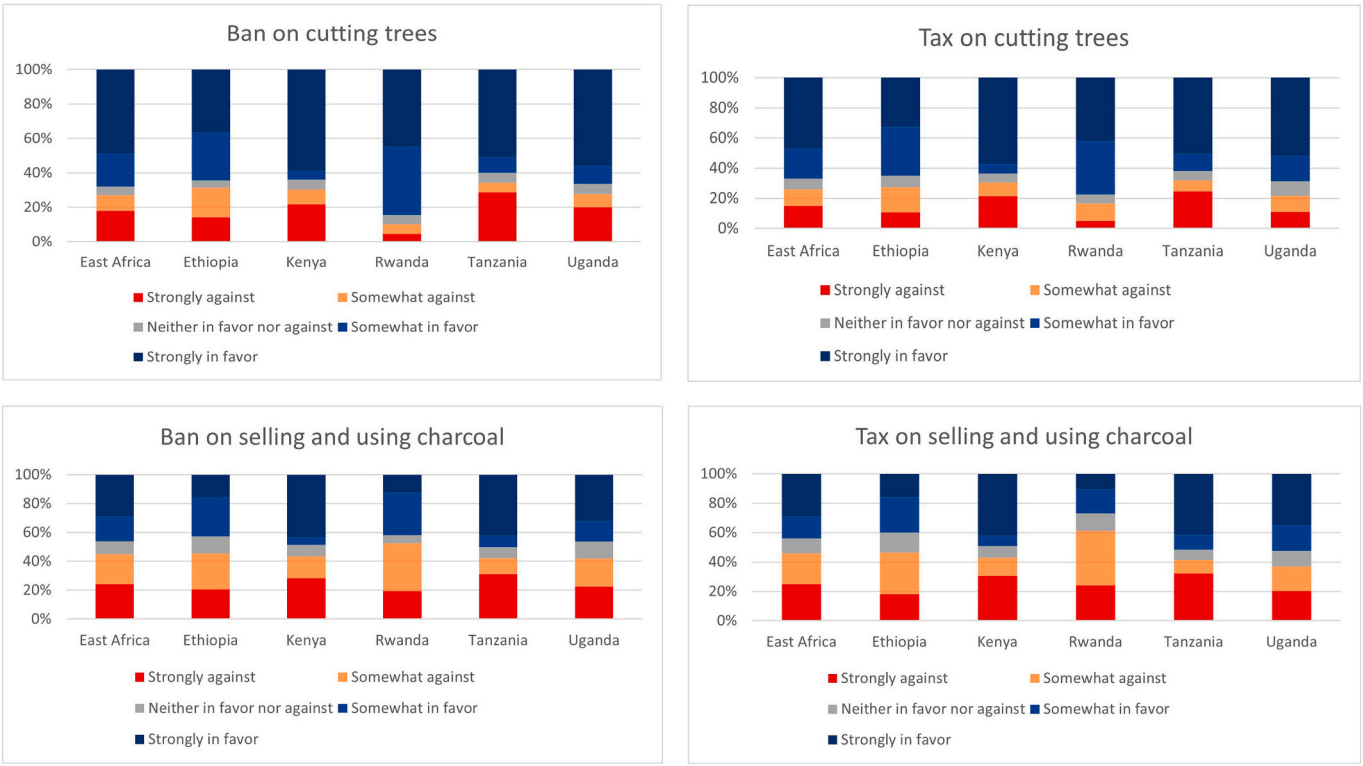

Fig. 1. Public Acceptance of a ban and a tax/on tree cutting in public and community forests, and of a ban and a tax on selling and using charcoal in five East African countries. N=4542 in the regional sample.

Model coefficients represent marginal effects on the latent propensity to support each policy instrument. Likelihood-ratio tests confirm that incorporating country-level random intercepts significantly improves model performance for most outcomes. Once contextual covariates are included, the estimated variance of the random intercepts approaches zero, indicating that cross-country variation is largely explained by observable national characteristics rather than unobserved heterogeneity.

For individual-level determinants, the results are highly consistent across instruments and align with theoretical expectations. Environmental concern is significant and positively associated with acceptance of both bans and taxes in all models. Self-interest motives operate in the opposite direction. Frequent firewood use is negatively associated with acceptance of all forest-policy instruments, and charcoal use is negatively associated with support for charcoal-related bans and taxes. These results indicate that reliance on forest-derived energy sources constrains willingness to endorse restrictive measures. Trust in government is positively associated with acceptance of all four policy measures, whereas the relationship between trust in environmental authorities and acceptance is weaker and, in some models, negative. This asymmetry suggests that citizens' confidence in the overarching government apparatus matters more than confidence in specialized environmental agencies. Interpersonal trust (trust in other people) is positively associated with support for all policy measures, but for a ban on tree cutting this association is not statistically significant.

Among socio-demographic variables, higher education is significantly positively associated with greater acceptance of all four policy measures, but the association is weaker when income is included as a control variable. Higher income is positively associated with acceptance of all four policy measures. We do not find significant associations related to the place of residence of the respondents and policy acceptance. Neither do we find clear patterns in the associations between gender and age respectively, and policy acceptance, although men tend to express slightly greater support for bans than women.

Three country-level variables, access to clean cooking fuels, government effectiveness, and recent tree-cover loss, were incorporated in the model to capture structural and governance factors related to public attitudes.

Access to clean cooking fuels shows a significant positive association with the ban on tree cutting, but the associations are not statistically significant for the other policy measures. The interaction terms between household charcoal use and clean-fuel access in Table 4 are negative, indicating that the negative association between charcoal use and policy acceptance remains even when access to clean fuels increases. This pattern, observed for both a charcoal ban and tax, indicates that even where modern energy alternatives are more available, charcoal-dependent households remain less supportive of restrictive forest policies.

In Model 3, the coefficient for government effectiveness is negative and statistically significant across all instruments. This reflects a conditional main association: holding clean-fuel access, tree-cover loss and individual covariates constant, countries with higher government effectiveness exhibit lower average acceptance of bans and taxes. A plausible interpretation is that where enforcement capacity is already perceived as stronger, stricter measures are seen as more likely to be enforced, raising their (negative) salience to the respondents. In Model 4, the trust in government × government effectiveness interaction term is positive and significant, indicating that effectiveness is associated with higher acceptance among respondents with high trust in government, whereas acceptance remains lower when trust is low. This pattern aligns with evidence that institutional capacity enhances public support when accompanied by credible and trusted governance (Davidovic and Harring, 2020). Tree-cover loss is positively and significantly associated with a ban and a tax on charcoal, but insignificant in relation to the other instruments. The interaction between tree cover loss and environmental concern is positive and significant across all policy measures, suggesting that concern matters more where forest loss is higher.

Table 3
Regression Results of public acceptance of a ban and tax on cutting trees in public and community forests in East Africa (Multi-Level Mixed Effects Ordered Probit Models).

Variables	Cutting Tree Ban				Cutting Tree Tax			
	1	2	3	4	5	6	7	8
Trust in Government	0.21***	0.19***	0.22***	0.29***	0.21***	0.20***	0.21***	0.27***
	(0.04)	(0.04)	(0.04)	(0.05)	(0.04)	(0.04)	(0.04)	(0.05)
Trust in Environment	−0.03	−0.02	0.00	−0.00	−0.11**	−0.08*	−0.06	−0.07
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Trust in People	0.03	0.03	0.04	0.04	0.17***	0.18***	0.18***	0.18***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Level of Concern	0.36***	0.35***	0.36***	0.37***	0.32***	0.31***	0.31***	0.32***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Charcoal Use	0.00	−0.01	0.01	0.01	−0.01	−0.01	0.00	−0.01
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Firewood use	−0.39***	−0.35***	−0.38***	−0.37***	−0.44***	−0.39***	−0.40***	−0.38***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Higher Education	0.08**	0.07*	0.07*	0.07*	0.17***	0.13***	0.14***	0.14***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Controls		X	X	X		X	X	X
Clean Fuels			0.05**	0.08***			0.02	0.05*
			(0.02)	(0.03)			(0.02)	(0.03)
Firewood_use# Cleanfuels				−0.04				−0.02
				(0.04)				(0.04)
Tree Cover Loss			−0.01	−0.03			−0.02	−0.07**
			(0.02)	(0.03)			(0.02)	(0.03)
Concern# Treecoverloss				0.09**				0.12***
				(0.03)				(0.03)
Government Effectiveness			−0.04*	−0.23***			−0.06***	−0.25***
			(0.02)	(0.05)			(0.02)	(0.05)
TrustGov# Goveff				0.22***				0.22***
				(0.05)				(0.05)
cut1	−0.74***	−0.60***	−0.56***	−0.50***	−0.91***	−0.78***	−0.76***	−0.70***
	(0.06)	(0.09)	(0.09)	(0.10)	(0.06)	(0.10)	(0.09)	(0.09)
cut2	−0.42***	−0.28***	−0.24***	−0.18*	−0.48***	−0.34***	−0.32***	−0.26***
	(0.06)	(0.09)	(0.09)	(0.09)	(0.06)	(0.10)	(0.09)	(0.09)
cut3	−0.25***	−0.11	−0.07	−0.01	−0.25***	−0.11	−0.10	−0.04
	(0.06)	(0.09)	(0.09)	(0.09)	(0.06)	(0.10)	(0.09)	(0.09)
cut4	0.27***	0.42***	0.46***	0.52***	0.32***	0.47***	0.48***	0.55***
	(0.06)	(0.09)	(0.09)	(0.09)	(0.06)	(0.10)	(0.09)	(0.09)
var(_cons[Country])	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Observations	4542	4542	4542	4542	4542	4542	4542	4542
Number of groups	5	5	5	5	5	5	5	5

Note: Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Cut1–Cut4 are estimated threshold parameters that partition the underlying latent variable of policy acceptance into the observed five response categories (from "strongly against" to "strongly in favour"). These parameters have no direct substantive interpretation but are required for estimating the ordered probit model. The row var.(_cons[Country]) reports the estimated variance of the country-level random intercept, indicating the extent of between-country heterogeneity after accounting for included covariates.

3.3. Robustness analyses

To assess the stability of our findings, we conducted two complementary robustness checks: (i) single-level ordered probit models, and (ii) multivariate probit models allowing correlated errors across policy instruments. Both confirm the consistency of results from the multilevel mixed-effects ordered probit framework.

First, the single-level ordered probit models serve as a benchmark for evaluating the role of country-level random effects. As shown in Supplementary S7, their coefficients closely match those from the multilevel models in both sign and significance across all four policy instruments. In every case, environmental concern and education remain strong positive predictors of policy acceptance, while charcoal and firewood use continue to reduce support. Trust in government maintains a robust positive association with acceptance of tree-cutting restrictions, whereas trust in environmental authorities is weaker or occasionally negative. These results indicate that the findings are not driven by the hierarchical structure or the assumed error distribution. Second, the multivariate probit (MVP) model jointly estimates binary versions of the four outcomes and allows for correlated error terms. This capture shared latent attitudes toward environmental regulation. As reported in Supplementary S8, the MVP results mirror those of the main models: trust in government and interpersonal trust remain positive and significant, environmental concern retains a strong positive effect, and dependence on charcoal or firewood continues to predict lower support. Positive, significant cross-equation correlations further indicate that acceptance of different instruments is interrelated rather than independent. The robustness checks show that the main coefficients capturing self-interest, environmental concern, trust, and education remain consistent across different model types and specifications. This strengthens confidence that the results are reliable and not dependent on how the models were specified or estimated.

4. Discussion

This study provides the first large-scale, cross-country assessments of public acceptance of forest conservation policies in East Africa, addressing a major gap in the literature on environmental policy acceptance in non-OECD contexts. While environmental and climate policy acceptance has been extensively studied in OECD countries, research on public attitudes toward forest policies in low- and middle-income regions remains scarce and often relies on smaller case studies or qualitative assessments. Our results indicate that individual-level determinants and country-level contextual factors jointly account for much of the variation in acceptance across the five countries.

We find greater public acceptance of bans and taxes on tree cutting

Table 4
Regression Results of public acceptance of a ban and tax on selling and using charcoal in East Africa (Multi-Level Mixed Effects Ordered Probit Models).

Variables	Ban on Charcoal				Tax on Charcoal			
	1	2	3	4	5	6	7	8
Trust in Government	0.15***	0.14***	0.14***	0.15***	0.15***	0.15***	0.15***	0.16***
	(0.04)	(0.04)	(0.04)	(0.05)	(0.04)	(0.04)	(0.04)	(0.05)
Trust in Environment	0.00	0.01	0.01	0.01	−0.07*	−0.06	−0.06	−0.06
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Trust in People	0.16***	0.16***	0.17***	0.16***	0.24***	0.25***	0.25***	0.25***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Level of Concern	0.27***	0.27***	0.27***	0.27***	0.15***	0.15***	0.15***	0.15***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Charcoal Use	−0.30***	−0.30***	−0.30***	−0.24***	−0.32***	−0.33***	−0.33***	−0.28***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Firewood use	−0.27***	−0.26***	−0.26***	−0.22***	−0.26***	−0.21***	−0.21***	−0.17***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Higher Education	0.10***	0.10***	0.10***	0.09**	0.16***	0.12***	0.12***	0.11***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Controls		X	X	X		X	X	X
Clean Fuels			0.05	0.24***			0.01	0.17***
			(0.03)	(0.05)			(0.02)	(0.03)
Charcoal_use# Cleanfuels				−0.29***				−0.24***
				(0.04)				(0.04)
Tree Cover Loss			0.08**	−0.00			0.12***	0.04
			(0.03)	(0.05)			(0.02)	(0.03)
Concern# Treecoverloss				0.09***				0.10***
				(0.03)				(0.03)
Government Effectiveness			−0.14***	−0.17**			−0.20***	−0.24***
			(0.03)	(0.07)			(0.02)	(0.05)
TrustGov# Goveff				0.05				0.06
				(0.05)				(0.05)
cut1	−0.69***	−0.48***	−0.48***	−0.36***	−0.77***	−0.59***	−0.60***	−0.50***
	(0.09)	(0.12)	(0.09)	(0.10)	(0.11)	(0.13)	(0.09)	(0.09)
cut2	−0.09	0.13	0.12	0.24**	−0.17	0.02	0.01	0.11
	(0.09)	(0.12)	(0.09)	(0.10)	(0.11)	(0.13)	(0.09)	(0.09)
cut3	0.14	0.36***	0.35***	0.48***	0.10	0.29**	0.28***	0.38***
	(0.09)	(0.12)	(0.09)	(0.10)	(0.11)	(0.13)	(0.09)	(0.09)
cut4	0.64***	0.87***	0.86***	0.99***	0.55***	0.74***	0.73***	0.84***
	(0.09)	(0.12)	(0.09)	(0.10)	(0.11)	(0.13)	(0.09)	(0.09)
var(_cons[Country])	0.03	0.03	0.00	0.01	0.04	0.04	0.00	0.00
	(0.02)	(0.02)	(0.00)	(0.01)	(0.03)	(0.03)	(0.00)	(0.00)
Observations	4542	4542	4542	4542	4542	4542	4542	4542
Number of groups	5	5	5	5	5	5	5	5

Note: Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Cut1–Cut4 are estimated threshold parameters that partition the underlying latent variable of policy acceptance into the observed five response categories (from "strongly against" to "strongly in favour"). These parameters have no direct substantive interpretation but are required for estimating the ordered probit model. The row var.(_cons[Country]) reports the estimated variance of the country-level random intercept, indicating the extent of between-country heterogeneity after accounting for included covariates.

on public lands (67 and 68%, respectively) than for bans and taxes on charcoal production and sales (44 and 46%, respectively). This difference should not be interpreted as a lack of recognition that charcoal production contributes to deforestation. Rather, it reflects how policy instruments are perceived by the public. Restrictions on tree cutting on public lands are likely to be viewed as targeting deforestation directly, whereas charcoal-related measures are perceived as affecting a primary household energy source. Given that our sample is skewed toward urban and more educated respondents, acceptance levels may be overstated relative to forest-adjacent and rural populations, where dependency on fuel wood and other forest resources is higher.

At the individual level, the patterns are consistent with prior work. Our findings confirm that self-interest motives play a significant role in public acceptance of the forest conservation policies in focus, with individuals who rely heavily on firewood and charcoal being less likely to accept restrictive policies. This aligns with prior research on resource dependency and policy resistance (Jumbe and Angelsen, 2007), where individuals who directly depend on a resource are more likely to oppose policies that increase costs or restrict access. These results are also consistent with policy implementation experiences in Tanzania and Kenya, where charcoal bans without viable energy alternatives have led to illegal trade and enforcement difficulties (Doggart et al., 2020; Wekesa et al., 2023; Bartlett, 2024).

In line with earlier research (Drews and van den Bergh, 2016; Monroe et al., 2019; Serbruyns and Luyssaert, 2006), we find that higher environmental concern and education is positively associated with acceptance of the studied forest conservation policies. This underscores the potential role of environmental education and awareness campaigns as potential levers for increasing public acceptance.

Previous research from OECD contexts suggests that interpersonal trust (trust in others) and institutional trust are generally positively associated with public acceptance of environmental policies (Davidovic and Harring, 2020; Bergquist et al., 2022). Our findings indicate a similar pattern in East Africa. Trust in government is positively associated with acceptance across instruments, while the association for trust in environmental authorities is weaker and occasionally negative. Interpersonal trust is generally positive but not statistically significant for the tree-cutting ban. This aligns with Ostrom's work on collective action, highlighting that trust strengthens cooperation and effective governance of shared resources such as forests, across both local and national scales (Ostrom, 1990, 1998, 2005).

At the same time, charcoal-dependent households remain less supportive of charcoal-related bans and taxes even in countries with greater access to clean cooking fuels. The negative interaction between charcoal use and clean-fuel access indicates that the lower acceptance among charcoal users does not disappear in contexts where cleaner alternatives

are more widely available. This suggests that expanding access to modern energy, while relevant at the aggregate level, may be insufficient on its own to address opposition among households that depend on charcoal.

Beyond individual and relational determinants, our multi-level analysis identifies how structural and governance contexts condition individual attitudes toward forest policies. Access to clean cooking fuels is positively associated with acceptance of the tree-cutting ban, consistent with lower overall reliance on biomass in settings where alternative energy options are more available.

However, the interaction between charcoal use and clean-fuel access is negative and statistically significant, suggesting that the lower acceptance among charcoal users persists even in countries where cleaner alternatives are more widely available. This pattern, observed for both a charcoal ban and tax, indicates that expanding access to modern energy, while relevant at the aggregate level, may be insufficient on its own to address opposition among charcoal-dependent households.

Government effectiveness exhibits a negative main association in models without interactions. This association becomes positive and significant when combined with trust in government, indicating that institutional capacity fosters acceptance primarily where governance is perceived as credible and fair. This finding aligns with prior research showing that legitimacy mediates the effect of administrative capacity on policy support (Davidovic and Harring, 2020). Strengthening transparency and accountability in enforcement could therefore be essential for translating administrative capacity into public trust and acceptance

Tree-cover loss is positively associated with acceptance of charcoal-related bans and taxes, suggesting that visible deforestation increases the perceived urgency of regulatory measures. The positive interaction between environmental concern and tree-cover loss across all instruments further shows that concern exerts a stronger influence on acceptance in countries where forest degradation is more apparent. Taken together, these findings indicate that structural conditions, institutional quality, and environmental salience all affect public acceptance of forest policies in East Africa.

While this study provides new insights into public acceptance of forest policies across five East African countries, several limitations should be acknowledged. The sample is skewed toward urban and more educated respondents, and results may not fully represent forest-adjacent or rural populations where forest dependence is higher. Future research should explore these groups, as well as longitudinal and comparative perspectives in other tropical forest regions, to better understand how public acceptance evolves as policy implementation advances. Although our analysis focused on socio-economic and trust-based determinants, cultural and behavioral factors, such as cooking traditions and local norms, may also influence how communities respond to forest policies (Asada, 2019; Wuepper, 2020; Wuepper et al., 2023; Bau et al., 2025). Integrating such perspectives could further improve understanding of the conditions under which forest conservation measures gain public legitimacy.

5. Conclusions

This study provides comparative evidence on the factors associated with public acceptance of forest conservation policies across five East African countries. Acceptance is higher for bans and taxes on tree cutting on public lands than for measures restricting charcoal use, suggesting that policies perceived to directly constrain household energy access face greater resistance than restrictions on tree cutting in public forests. Use of firewood or charcoal, environmental concern, education, and trust are consistent individual-level correlates of acceptance.

At the national level, structural and governance conditions are also associated with policy acceptance. Greater access to clean cooking fuels is linked to higher acceptance of bans on tree-cutting. However, households that depend on charcoal tend to express lower support for charcoal-related bans and taxes, even in contexts where cleaner energy alternatives are more widely available. Institutional capacity, measured by government effectiveness, is associated with higher acceptance primarily where governments are more trusted, while the extent of recent forest loss reinforces the association between environmental concern and policy support. These findings suggest that acceptance of forest conservation policies may be enhanced in this context through transparent implementation, opportunities for meaningful public participation and expanded access to clean energy, combined with efforts that address the specific needs of charcoal-dependent households.

This study contributes empirically and methodologically to the literature on environmental policy acceptance by providing a large-scale, cross-country assessment of public acceptance of forest conservation policy instruments in East Africa. By combining a harmonized population survey with a multi-level modeling framework, the analysis adds comparative evidence to a literature in the region that has often relied on single-country studies and smaller-scale case analyses. It also extends insights from the broader policy acceptance literature by examining how individual-level correlates of stated support interact with national structural and governance contexts in low- and middle-income countries. Methodologically, the multi-level mixed-effects approach allows for a systematic examination of both individual-level correlates and national contextual conditions within a unified empirical framework, offering a comparative perspective on variation in forest policy acceptance across countries.

While the survey sample is skewed toward urban and more educated respondents, the cross-country perspective offers valuable insights into how socio-economic and contextual factors relate to policy acceptance. Future research should examine rural and forest-adjacent populations, monitor changes in attitudes over time, and extend comparative analyses to other tropical forest regions.

Declaration of Generative AI and AI assisted technologies in the writing process

The authors used ChatGPT (OpenAI GPT-4) in the process of revising and improving the clarity, coherence, and overall readability of this manuscript. The authors carefully reviewed, edited, and approved all text generated through this process and take full responsibility for the content presented.

CRediT authorship contribution statement

Aloyce Hepelwa: Methodology, Formal analysis, Conceptualization, Writing – review & editing, Writing – original draft. **Michael Ndwiga:** Investigation, Formal analysis, Writing – review & editing, Writing – original draft. **Daniel Slunge:** Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Conceptualization, Writing – review & editing, Writing – original draft. **Matilda Ntiyakunze:** Writing – review & editing, Writing – original draft. **Boscow Okumu:** Writing – review & editing, Writing – original draft. **Hailemariam Teklewold:** Writing – review & editing, Writing – original draft. **Peter Babyenda:** Writing – review & editing, Writing – original draft. **Jesper Stage:** Writing – review & editing, Writing – original draft.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.forpol.2026.103727.

Data availability

The dataset as well as the questionnaire in English are available in the repository of the Swedish National Data Service [https://snd.se/sv/catalogue/dataset/2024-446].

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