

Collaborative Governance Challenges and Conservation of Protected Forests: A Case of Karura Forest, Nairobi City County, 2019-2023

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Abstract: Collaborative governance has emerged as a key approach to managing shared natural resources, particularly protected forests, where multiple stakeholders interact. This study examines how governance challenges affect conservation outcomes in Karura Forest. A descriptive mixed methods design was applied, drawing on managing the commons theory, stakeholder theory, and the advocacy coalition framework. Data were collected from 130 respondents using questionnaires, interviews, and document analysis, and analyzed using descriptive statistics and multiple regression. The results indicate that resource constraints, power imbalances, trust deficits, and diverse stakeholder interests significantly influence conservation outcomes, jointly explaining 83.4% of observed variation. Resource constraints were identified as the most influential factor. The findings highlight the importance of inclusive governance reforms, equitable resource allocation, balanced power structures, and strengthened trust among stakeholders. The study contributes to understanding how collaborative governance dynamics shape conservation effectiveness in urban forest settings.

Keywords: Collaborative Governance, Conservation, Power Imbalance, Resource Constraints, Trust Building, Mixed Methods, Forest Governance, Urban Forestry, and Kenya

1. Introduction

The conservation of commons remains a critical area of research, particularly in achieving Sustainable Development Goal 15, which focuses on protecting terrestrial ecosystems (Huan, & Zhu, 2023). Collaborative governance has emerged as an important approach in managing shared natural resources such as forests (Aiguobarueghian et al., 2024). It promotes stakeholder participation, including governments, communities, and non-state actors. However, this approach faces challenges such as resource constraints, power imbalances, trust deficits, and conflicting interests, which may undermine conservation outcomes.

Globally, collaborative governance has supported forest conservation in countries such as Canada and the United States by integrating indigenous knowledge, community participation, and institutional frameworks (Akaliyev et al., 2024). Similarly, European countries like Germany, Finland, and France apply participatory approaches involving governments, NGOs, and citizens in forest management. In developing regions across Asia, Latin America, and Africa, collaborative governance is increasingly used to address deforestation, illegal logging, and land degradation (Roengtam, & Agustiyara, 2022). African countries such as Ghana, Cameroon, and Liberia demonstrate the effectiveness of community-based and multi-stakeholder forest conservation initiatives.

In East Africa, countries like Tanzania and Uganda have adopted community-based forest management models that empower local communities and enhance conservation outcomes (Tebkew & Atinkut, 2022). In Kenya, collaborative governance has been applied in protected areas such as Karura Forest, where multiple stakeholders work together to address environmental challenges like illegal logging and encroachment. Despite its potential, collaborative governance

is hindered by operational and institutional challenges that affect its effectiveness.

2. Methodology

Research Design

This study adopted a descriptive research design using a mixed-methods approach to examine collaborative governance challenges in the conservation of Karura Forest. The design was appropriate as it enabled an in-depth understanding of governance dynamics without manipulating variables. It facilitated analysis of stakeholder interactions, institutional arrangements, and conservation outcomes.

Study Population

The study population comprised stakeholders involved in the governance and conservation of Karura Forest. These included 19 Friends of Karura Forest (FKF) board members, 1,500 FKF members, 11 Kenya Forest Service (KFS) board members, 12 conservation supervisors, 8 KFS regional commanders, 300 KFS rangers, and 95 FKF scouts, totaling 1,945 respondents. These groups were selected due to their direct involvement in forest governance and conservation activities.

Sampling Techniques and Sample Size

Stratified random sampling was used to ensure representation across stakeholder categories. A total sample size of 130 respondents was selected, including FKF board members and members, KFS officials, conservation supervisors, regional commanders, rangers, and FKF scouts. This approach ensured proportional representation and reduced sampling bias.

Research Instruments

Data were collected using structured questionnaires containing both closed and open-ended questions. The

questionnaire was preferred for its ability to ensure anonymity, encourage honest responses, and allow efficient data collection from a large sample. It was divided into five sections aligned with the study objectives.

Validity and Reliability

Content validity was ensured through expert review by the academic supervisor, who assessed clarity, relevance, and alignment with research objectives. Construct validity was assessed using Exploratory Factor Analysis (EFA) after data collection to confirm alignment with theoretical constructs such as trust, power dynamics, and resource adequacy.

Reliability was tested using Cronbach's Alpha Coefficient, with a threshold of 0.7 or above considered acceptable (McNeish, 2018). This ensured internal consistency and improved the credibility of the instrument.

Data Collection

Both primary and secondary data were used. Primary data were collected through questionnaires, while secondary data were obtained from literature and relevant documents. This combination enhanced triangulation and strengthened the study's validity.

Diagnostic Tests

Linearity tests assessed relationships between variables. Normality was tested using the Shapiro-Wilk test ($p > 0.05$ indicating normal distribution). Homoscedasticity was assessed using the Levene test ($p > 0.05$ indicating equal variances). Multicollinearity was tested using Variance Inflation Factor (VIF), where values above 10 indicated serious issues.

Data Analysis

Data were analyzed using SPSS version 21. Quantitative data were analyzed using descriptive statistics (means, frequencies, percentages), while qualitative data were analyzed thematically. Inferential analysis included multiple regression to examine relationships among variables. The model used was:

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \varepsilon$$

Where Y represents conservation outcomes, X_1 stakeholder interests, X_2 resource constraints, X_3 power imbalances, and X_4 trust building.

Hypotheses Testing

Four null hypotheses were tested on the effects of stakeholder interests, resource constraints, power imbalances, and trust on conservation outcomes. Regression analysis, t-tests, and ANOVA were used. A p-value < 0.05 led to rejection of the null hypothesis, indicating significant effects.

Ethical Considerations

The study adhered to ethical principles of respect, beneficence, and justice to ensure research integrity and protect participants. Anonymity and confidentiality were maintained through coded data and secure storage. Participants were informed about study's purpose, procedures, and their rights, and informed consent was obtained prior to data collection, with participation being

voluntary and respondents free to withdraw at any time or skip questions without penalty. Ethical approval and necessary permissions were obtained before data collection, and cultural sensitivities were respected throughout the research process.

3. Results & Discussion

Descriptive Statistics for Governance Challenges

Diverse stakeholders interest

Respondents indicated frequent conflicting priorities among stakeholders, with a mean of 4.09 (SD = 0.785). Most confirmed a multiplicity of issues, including varying time horizons, conflicting priorities, and differing cultural perspectives, with a mean of 3.25 (SD = 0.871). Differences in cultural perspectives were also common (mean = 3.16, SD = 0.969), while fewer respondents agreed that varying time horizons were frequent (mean = 2.91, SD = 1.032). The overall mean for diverse stakeholder interests was 3.35 (SD = 0.914), indicating moderate agreement. These findings align with studies by De Valck and Rolfe (2019) and Muchapondwa and Ntuli (2024), which reported similar stakeholder conflicts in conservation contexts.

Resource constraints

The study assessed perceptions of resource constraints in conservation. A majority of respondents reported limited funding as a frequent challenge (mean = 3.19, SD = 0.680), while human resource limitations were also widely acknowledged (mean = 3.13, SD = 0.751). A notable proportion indicated the presence of combined constraints including funding, expertise, and staffing shortages (mean = 2.69, SD = 0.939). However, only a few respondents specifically identified insufficient expertise as a standalone issue (mean = 1.91, SD = 1.358). The aggregate mean score was 2.73 (SD = 0.932), indicating moderate overall constraints. Findings align with Botha et al. (2021) and Kegamba et al. (2024), emphasizing financial limitations in conservation.

Power Imbalances

The study assessed perceptions of power imbalances in conservation governance. Most respondents indicated that minority groups are marginalized (mean = 3.18, SD = 0.617), while stakeholder dominance was also evident (mean = 3.02, SD = 0.823). Information asymmetry was reported to a moderate extent (mean = 2.59, SD = 0.985). The aggregate mean score for power imbalances was 2.74 (SD = 0.863), indicating a moderate overall effect. Findings suggest that unequal power distribution among stakeholders remains a key governance challenge, particularly through exclusion of minority groups and dominance by influential actors. These results align with Trogisch (2021), who highlight similar governance inequalities in conservation settings.

Trust Building

Trust building recorded an overall mean of 3.68 (SD = 0.926), indicating moderate agreement that it is a governance challenge. Most respondents reported lack of trust (mean = 4.18, SD = 0.671) and low awareness of conservation (mean = 4.02, SD = 0.726). Other challenges included lack of transparency, weak communication, and historical mistrust

(mean = 3.63, SD = 0.852), while transparency alone recorded a mean of 3.59 (SD = 0.914). Effective communication exhibited lower mean values (mean = 2.98, SD = 1.520). In aggregate, governance challenges averaged 3.18, with trust building being the most significant. These findings, which align with Saif et al. (2022) highlight the strong negative influence of weak trust on conservation effectiveness.

Forest conservation

The study examined subcomponents of the independent variables and their effects on forest cover. Conflicting priorities were identified as a key factor affecting forest cover (mean = 3.69, SD = 0.215), followed by stakeholder dominance (mean = 3.51, SD = 0.236) and insufficient expertise (mean = 3.44, SD = 0.249). Marginalization of minority groups (mean = 3.38, SD = 0.196), communication effectiveness (mean = 3.33, SD = 0.335), and cultural differences (mean = 3.14, SD = 0.586) also had notable effects. Human resource limitations (mean = 2.96, SD = 0.624), transparency (mean = 2.58, SD = 0.715), and asymmetric information (mean = 2.39, SD = 0.876) had lower effects, while historical mistrust had the least impact (mean = 1.97, SD = 1.243). Conversely, limited funding was identified as the most significant factor (mean = 3.72, SD = 0.129). Findings align with Botha et al. (2021) and Kegamba et al. (2024), emphasizing financial limitations in conservation.

Forest biodiversity

Questions were posed to respondents on subcomponents of independent variables and their effects on forest biodiversity. Stakeholder dominance was identified as the most significant factor (mean = 4.19, SD = 0.215; 0.371), followed by varying time horizons (mean = 3.81, SD = 0.913) and conflicting priorities (mean = 3.59, SD = 0.532). Insufficient expertise (mean = 3.36, SD = 0.649), minority marginalization (mean = 3.28, SD = 0.381), and human resource limitations (mean = 3.20, SD = 0.754) also had notable effects. Historical mistrust (mean = 3.19, SD = 0.861) and asymmetric information (mean = 3.16, SD = 0.989) showed moderate influence, while limited funding (mean = 2.98, SD = 1.326) and transparency (mean = 2.79, SD = 1.229) had lower effects. Cultural differences were highlighted as highly significant (mean = 4.42, SD = 0.286). These findings align with Junior et al. (2020) and Musakwa et al. (2020), who emphasized cultural diversity as a key challenge in biodiversity conservation.

Enforcement of forest conservation

Respondents were asked about the effects of independent variable components on enforcement of conservation. Varying time horizons were identified as the most significant factor affecting enforcement (mean = 4.12, SD = 0.242), followed by conflicting priorities (mean = 3.97, SD = 0.331) and limited funding (mean = 3.91, SD = 0.420). Asymmetric information (mean = 3.52, SD = 0.569), effective communication (mean = 3.44, SD = 0.722), and historical mistrust (mean = 3.36, SD = 0.692) also had notable effects. Stakeholder dominance (mean = 3.25, SD = 0.732) and human resource limitations (mean = 3.04, SD = 0.744) showed moderate influence, while minority marginalization (mean = 2.88, SD = 0.895), cultural differences (mean = 2.69, SD = 0.986), transparency (mean = 2.29, SD = 1.091), and insufficient expertise (mean = 2.24, SD = 1.253) had lower effects. These findings align with those of Killen (2023) and

De Valck & Rolfe (2019), highlighting time delays and conflicting priorities as key enforcement challenges.

Governance challenges that affect conservation the most

The study examined governance-related sub-variables influencing conservation outcomes. Varying time horizons were identified as the most significant challenge (mean = 3.75, SD = 0.191), followed by marginalization of minority groups (mean = 3.69, SD = 0.295) and insufficient expertise (mean = 3.56, SD = 0.340). Limited funding (mean = 3.42, SD = 0.318) and human resource limitations (mean = 3.19, SD = 0.491) also had notable effects. Moderate influences were reported for cultural differences (mean = 2.99), stakeholder dominance (mean = 2.93), conflicting priorities (mean = 2.89), and communication challenges (mean = 2.82). Historical mistrust, asymmetric information, and transparency showed lower effects. Findings align with Killen (2023) and De Valck & Rolfe (2019).

Multiple linear regression for direct relationship

The study used multiple linear regression to examine the effect of diverse stakeholder interests, resource constraints, power imbalances, and trust building on conservation of Karura Forest. The model showed a strong relationship ($R = 0.913$), with an adjusted R^2 of 0.834, indicating that 83.4% of variation in conservation is explained by the variables. The model was statistically significant ($F = 208.381$, $p < 0.001$). Resource constraints had the strongest effect, followed by power imbalance, trust building, and stakeholder interests. All p-values were below 0.05, leading to rejection of all null hypotheses. The findings confirm significant impacts of governance challenges on conservation outcomes.

4. Conclusion

This study demonstrates that collaborative governance challenges, including resource constraints, power imbalances, trust deficits, and conflicting stakeholder interests, significantly influence conservation outcomes in Karura Forest. Among these factors, resource constraints exert the strongest effect, underscoring the importance of adequate funding and capacity. The findings highlight that effective conservation requires integrated governance approaches that promote equity, transparency, and stakeholder collaboration. Strengthening institutional coordination, enhancing trust among actors, and ensuring balanced participation can improve conservation performance. These insights provide practical guidance for policymakers and practitioners seeking to enhance sustainability in urban forest management.

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