Designing Institutional Arrangements for Collaborative Governance of Forests in Kenya Using a Delphi Process

Felix Lamech Mogambi Ming'ate[1*], Sammy Letema[2] and Kennedy Obiero[3]

[1]*Department of Environmental Studies and Community Development, Kenyatta University, Kenya.*
[2]*Department of Environmental Planning and Management, Kenyatta University, Kenya.*
[3]*Department of Geography, Kenyatta University, Kenya.*

Authors' contributions

This work was carried out in collaboration among all authors. Author FLMM designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors SL and KB managed the analyses of the study. Author FLMM managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

The focus of the study is to examine the institutional arrangement for forests governance in Kenya to understand the important design issues that can improve their performance in the delivery of sustainable livelihoods and conserve forests as they have been previously regarded as problematic. The study uses the Delphi technique to assemble information from 46 experts with vast experience in collaborative governance of forests in developing countries. The researchers then developed four questions which were asked across all the study experts. In the second round, all the expert responded to the four open-ended questions and all the qualitative results were analyzed manually by grouping them into interquartile ranges and only those issues that were above the 75th interquartile range were retained. In the subsequent third round of the Delphi technique the experts gave their answers, the responses were collated and returned to each respondent who then was invited to revise his/her estimates or to specify the reasons for remaining outside the consensus. In the fourth and final round, again, the responses were assembled and

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*Corresponding author: E-mail: mingate.felix@ku.ac.ke;

reported back to the participants to justify his/her position, whether or not he wishes to change his/her position. The results show that the Delphi technique has the potential for studying institutional design for collaborative governance of forests. The study recommends that the important issues identified can be used to help in the formulation of collaborative governance institutional design policies.

1. INTRODUCTION

The field of common-pool resources management has evolved considerably since the arguments of [1] on the tragedy of the commons and a new strategy of governing called "collaborative governance" has developed. This mode of governance brings multiple stakeholders together in common forums with public agencies to engage in consensus-oriented decision making [2,3,4,5,6]. Collaboration has been seen to enhance cooperation and foster belief change among stakeholders [6]. Ostrom [7] studies on the design of the institutional arrangements for collaborative governance of common-pool resources and the eight institutional design principles for common-pool resources marked a significant step forward in collaborative governance. However, these institutional design principles have received criticisms from many scholars [8,9,10,11], including Ostrom herself [7]. Yet a number of studies also indicate that the use of Ostrom's [12] institutional design principles to design common-pool resource management systems does not always result in stable and long-lasting institutional arrangements for collaborative governance of common-pool resources such as forests [13,14] Despite this clear contradiction in the current empirical literature, Ostrom's [7] institutional design principles have been widely applied in designing institutions for collaborative governance of forests around the world [10,13,15]. Furthermore, to date, the guidelines for designing each of these institutions do not exist [15].

Some scholars have argued that well designed institutional arrangements for collaborative governance of natural resources will improve the livelihood outcomes of the poor forest-dependent communities [16,17]. This argument has also been met with contradictions as it is not clear whether institutional arrangements for collaborative governance of forests can strengthen livelihoods of the poor communities depended on the forests at the same time conserve those forests [18,19,20,21,22,23,24].

Most of the studies have either studied forest collaborative institutions or livelihood outcomes; without showing linkages to the conservation of forests [10,13].

Further current literature indicates that the institutional arrangements for collaborative governance of forests are problematic [15,25]. Power imbalances between stakeholders are a commonly noted problem in collaborative governance [26,24,2]. Furthermore, if some stakeholders do not have the capacity, organization, status, or resources to participate, or to participate on an equal footing with other stakeholders, the collaborative governance process will be prone to manipulation by stronger actors [18].

Common property studies of community forest management have also shown how resource management is enhanced by three characteristics: Tenure security for communities that can devise and exclude others, community rules that are easily understood and community institutions including sanctioning, conflict resolution and accountability mechanisms [15,25] Clear enforceable institutional arrangements, exclusion and alienation of natural resources are also necessary for promoting successful forestry governance outcomes [12,15].

Other studies have also indicated that most donor agencies and governments dwell on promoting collaborative forest governance as a strategy to conserve forest resources and improve livelihoods of adjacent communities, yet results have not been uniform [10,20,27,28]. Some results have also shown that collaborative forest governance has not been straight forward [29].

Despite these glaring gaps in literature the Kenyan government is currently working on collaborative forest management intending to conserve the forest at the same time deliver sustainable livelihoods to the poor communities depended on the forest for their subsistence

goods and services [30,31,25]. Many countries have now developed, or are in the process of developing changes to national policies and legislation that institutionalise collaborative governance.

The goal of this paper is to build on the findings on this rich literature, by answering the question: to what extent are collaborative governance institutional arrangements appropriate for tropical forest governance and delivery of sustainable livelihood outcomes in developing countries where poverty is a major concern? This study, therefore, considers the following questions: (1) what are the core components of institutional arrangements for collaborative governance of forests? (2) what are the critical emerging themes or key questions on institutional arrangements for collaborative governance of forests that need fresh directions, core assumptions and that require testing or research to improve the institutional arrangements for collaborative governance of forest? (3) what are the key challenges or constraints confronting institutional arrangements for collaborative governance of forests in practice and/or application in Kenya? (4) How can one design successful collaborative forest governance institutional arrangements in Kenya?

2. MATERIALS AND METHODS

The study is qualitative. Qualitative research is characterized by its aims, which relate to understanding some aspect of social life, and its methods which generate words, rather than numbers, as data for analysis [32,33]. They further report that if a study aims to understand how a community or individuals within it perceive a particular issue, then qualitative methods are often appropriate. This paper aims at understanding the extent to which institutional arrangements for collaborative governance are appropriate for tropical forest governance and the delivery of sustainable livelihood outcomes in developing countries where poverty is a major concern [25]. Thus qualitative research design is necessary to understand the experiences and perspectives of experts on how to design long-lasting institutional arrangements for collaborative forest management that can sustain the forests and at the same time deliver sustainable livelihood outcomes.

The forests involved in collaborative governance in Kenya are Keraite, Nyamweru, Arabuko-Sokoke, Kakamega, Loita, and Upper Imenti are

examined (Fig. 1). A total of 46 experts were purposefully sampled from each forest category involved in collaborative governance of forest reserves in Kenya and personal interviews were conducted with each of them (Table 1). These experts included the key informants from various government ministries, the communities depended on the forests as a source of their livelihoods, leaders from the business community and the various civil society agencies. Patton [32] notes that in qualitative studies sample sizes are typically small.

The research employed a Delphi technique in data collection. The Delphi Technique is an intuitive methodology for organizing and sharing "expert" forecasts about the future [34]. Further, the Delphi technique is well suited as a means and method for consensus-building by using a series of questionnaires to collect data from selected experts for a particular field of study [35]. A Delphi process has been justified primarily because it prevents professional status and high position from forcing judgments in certain directions as it frequently occurs when experts meet. The intention is to assure that changes in estimates reflect a rational judgment, not the influence of certain opinion leaders [34].

Typically, the Delph procedure includes:

A questionnaire, mailed to respondents who remain anonymous to one another. Respondents first generate several rather concise statements of events, and in the second round give estimates as to the probability of each event occurring at a given date in the future. Once the respondents have given their answers, the responses are collated and returned to each respondent who then is invited to revise his estimates. The third-round responses are made with the knowledge of how others felt regarding the occurrence of each event. Again, the responses are assembled and reported back to the participants. If a respondent's estimate does not fall within the interquartile range of all conjectures, he is asked to justify his position, whether or not he wishes to change his position [34] pg 267).

To examine the institutional arrangement for the collaborative governance of forests the researchers developed four open-ended questions which were asked across all the experts of the various organizations involved in collaborative governance of the selected forest

reserves namely: households living adjacent to the forest, various government agencies; Kenya Wildlife Service (KWS), Kenya Forest Research Institute (KEFRI), National Museums of Kenya (NMK) and Kenya Forestry Service (KFS), civil society, Nature Kenya and registered Community Forest Associations (CFAs) in forests under study (Table 1).

As per the requirement of the Delph process, the researchers wanted the respondents to remain anonymous to one another. Thus Personal interviews ensured that all participants were kept anonymous and all the required participants were interviewed as the research made sure they accessed all the study respondents privately.

In the second round, the collected information in round one was converted into a well-structured questionnaire, which was used as the survey instrument to help give estimates as to the probability of each suggested issue importance in the design of institutional arrangements for collaborative governance of forests in Kenya.

In the third step, once the respondents gave their answers, the responses were collated and returned to each respondent who then was invited to revise his/her estimates or to specify the reasons for remaining outside the consensus.

In the fourth and final round, again, the responses were assembled and reported back to the participants. If a respondent's estimate does not fall within the interquartile range of all conjectures, he is asked to justify his position, whether or not he wishes to change his position [15,34].

A Delph process is appropriate when one wants to evaluate forestry conservation institutional design arrangements in relation to communities living adjacent to forest on the assumption that one way to improve the design of forestry conservation institutional arrangements and improvement of community dependent on forests livelihoods policies and plans is to expand the awareness among different forest management stakeholders of alternative future options as well as the expectations they hold about such options [15,34].

Table 1. Study respondents

| Forest Station	Type of respondent	Number of respondents
Kakamega Forest Reserve	Community forest association leaders	5
	(Kenya Forest Research Institute	2
	Centre for Kakamega Forest studies (Masinde Muliro University of Science and Technology)	1
	Biota Kenya	1
	Nature Kenya	1
	Kenya Forest Service	2
Arabuko-Sokoke Forest Reserve	Kenya Forest Research Institute	1
	Kenya National Museum	1
	Kenya Forest Service	1
	Nature Kenya	1
	CFA leaders	1
	Kenya Wildlife Service	1
Meru Forest Reserve	Kenya Wildlife Service	2
	Community Forest Association Leaders	5
	Centre for Environmental stewardship	1
	Kenya Forest Service	1
Kerita Forest Reserve	Kijabe Environment Volunteers	3
	Community forest Association leaders	5
	Kenya forest association	1
Nyamweru Forest Reserve	Kenya Forest Association	1
	CFA leaders	5
Loita Community Forest	Local chief	1
	CFA leaders	3
	Total Number of respondents	46
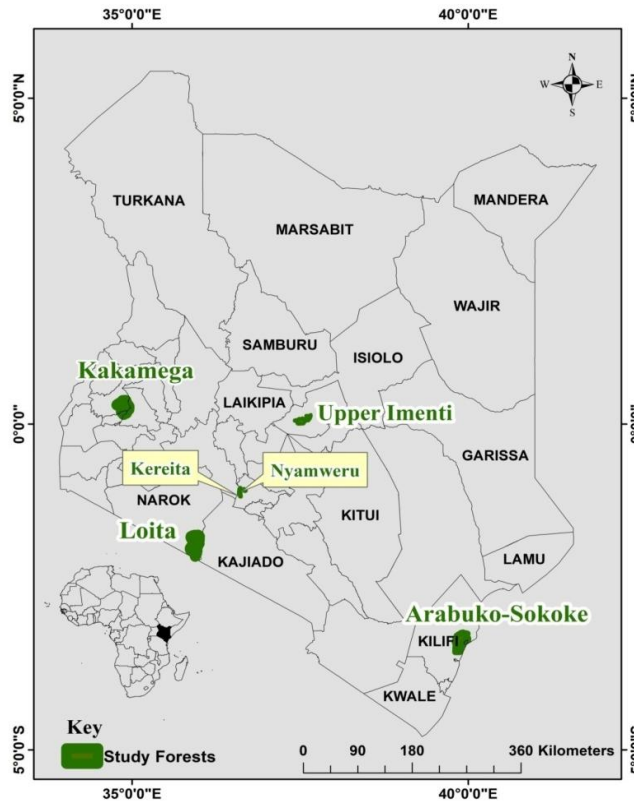
Fig. 1. Map showing the different studied location in Kenya

The weakness in the Delph approach, however, is that:

> *It employs collective opinion or subjective judgment as basic inputs to the forecasting process instead of quantifiable data. In effect, they operate on the principle that several heads are better than one in making subjective conjectures about the future, and that experts, within a controlled intuitive process, will make conjectures based upon rational judgment and shared information rather than merely guessing, and will separate hope from likelihood in the process. That is, it is assumed that experts are experts because they are objective, take into account new or discrepant information and construct logically sound deductions about the future based upon a thorough and disciplined understanding of particular phenomena and how they relate. Simply put, the methods are non-data based and rely on collective expert judgment [34] pg 269.*

However, despite the weakness, the Delph approach has been widely used in researches of this nature with positive result [35,34].

3. RESULTS

This paper intends to answer a key question in the current literature on to what extent are collaborative governance institutional arrangements appropriate for tropical forest governance and delivery of sustainable livelihood outcomes in developing countries where poverty is a major concern? To answer this question it considered the following research questions (1) What are the core components of institutional arrangements for collaborative governance of forests (2). What are the critical emerging themes or key questions on institutional arrangements for collaborative governance of forests that need fresh directions, core assumptions and that require testing or research to improve the institutional arrangements for collaborative governance of forest (3) what are the key challenges or constraints confronting institutional arrangements for collaborative governance of forests in practice and/or application and finally (4). What are the important issues that should be included in the design of institutional arrangements for collaborative governance of forests to make them work? The results from the questions are as follows:

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3.1 Delphi Process Rounds

Round one: In round one, the researchers developed and used the four questions to ask the group of experts to generate concise statements on how to design institutional arrangements for collaborative governance. At this round, the respondents raised 280 statements from all the four questions asked which were used in round two.

Round two: In this round, the ranking of suggested issues as important in collaborative governance in round one was done to establish expert probabilities using interquartile range. All the items that fall on the 75th percentiles and above were retained and used for round three and only 52 statements remained (Table 2). But only on one research question on the key challenges or constraints confronting institutional arrangements for collaborative governance of forests in practice and application where there was no item from round one that passed the 75th interquartile mark and therefore where not included in round two. However, through informal discussions the respondents argued that it is not that the collaborative management arrangement structures do not have challenges or the issues raised as challenges were not facing collaborative forest management structures; but they are issues that can be resolved. The key challenges or constraints provided in round one that were assigned relatively greatest importance included: (i) Bringing together all the stakeholders to participate in collaborative governance (ii) Community forest guards/scouts responsible for the management of the community forest do it on a voluntary basis they thus need to be paid (iv) community forest management teams need remuneration (v) there exist different interests among stakeholders (vii) Too much power of collaborative governance is with KFS (vii) benefit-sharing needs among the government agencies and participating communities to be thought out clearly, e.g. user rights should be clear (viii) community forest association office-bearers should have a minimum of form four qualifications.

Round three: In this round experts were allowed to make further clarifications of both the information and their judgments on the relative importance of the raised 52 issues as important in designing institutional arrangements for collaborative governance of forest in Kenya. All the 52 statements with above 75% interquartile range remained again (Table 2).

Round four: This round provides a final opportunity for participants to revise their judgments if at all they fill the issues raised in round three needs to change [35,34]. All the assembled responses never changed (Table 2). These issues were thus retained as important issues in designing collaborative governance of forests in Kenya.

4. DISCUSSION

The results have indicated several issues that are important in the design of institutional arrangements for collaborative governance. [2] refers to institutional design arrangements to the basic protocols and ground rules for collaboration, which are critical for the procedural legitimacy of the collaborative process. It has become apparent therefore that for collaborative governance to work there must be a clear entry point to the collaborative process e.g. by signing of agreements before collaborative governance of forests [2]. The results have also indicated that the process of collaborative governance must be inclusive enough to all the stakeholders so that they can be able to mirror their problems [36,37, 38,21]. The results also suggest that clear ground rules and process transparency are important design features for institutions for collaborative governance e.g.: (1) a constitution guiding the collaborative governance initiative (ii). training stakeholders on collaborative governance (iii) availability of a conflict management approach for stakeholders (iv) a clear Community Forest Associations (CFAs) funding structure (v) a clear allocation of responsibilities and roles in collaborative governance (vi) continuous capacity building for the stakeholders (vii) continuous evaluation for the collaborative governance work plans (viii) conducting of a baseline survey of the resources in the forest should be done before collaborative governance and; (ix) studying the community members and get their ideas as much as possible on collaborative implementation process before engaging with them [38]. Involvement of all the stakeholders from the start of the collaborative process is also key in eliminating skeptical frame of mind from the institutional design stakeholders [38]. Clear definition of stakeholders' roles in the institutional arrangement design for collaborative governance was also found to be key [24]. Formalization of collaborative governance structures for all the stakeholders is also an important collaborative governance institutional design feature [2] (continuous engagement with local forest adjacent community members [2]. Clear

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Table 2. Important issues in designing collaborative governance of forests in Kenya

Question	Important issues in collaborative governance of forests
Core components for collaborative governance of forests institutional design	Stakeholder partnerships in the implementation of a collaborative governance management plan A participatory forest management plan A conflict management approach for stakeholders Capacity building for all partners The well-established governance structure of collaborative governance Forest conservation fund must be included in collaborative governance Establishment of clear ways of engaging the community Education/awareness to stakeholders Community involvement in collaborative governance of forests Structured meetings by the key partners Consultation during the collaborative governance implementation process Funds for implementing collaborative governance Sensitization meetings on collaborative governance A budget for collaborative governance of forest A constitution guiding collaborative governance The signing of the agreement before collaborative governance of forests Collecting community views before establishing collaborative governance Well established roles and responsibilities in the PFM arrangement Establishment of good institutions that train people on collaborative governance Annual General Meeting for collaborative governance Aforestation and re-forestation of forests Involvement of technical bodies in collaborative governance of forests (KSF, KWS, ministry of water etc)
Key critical emerging issues in collaborative governance of forests that need to be addressed	Improvement of policy, rules and regulations Clear Community Forest Associations(CFAs) funding structures CFAs should have offices
Designing successful collaborative forest governance institutional arrangements	Ensure the full involvement of all the stakeholders from the start The budget allocation between the collaborating institutions should be well done There should be sustainability structure for the community involvement in collaborative governance Awareness creation/training/capacity building about PFM

Question	Important issues in collaborative governance of forests
	Scouting for markets for income-generating activities for the communities
	Continuous engagement with local forest adjacent community members
	Establishing a mechanism for conflict resolution
	Monitoring and evaluation of the entire PFM to see if it is on track
	An inbuilt budget for PFM
	Continuous evaluation for the work plans
	Change of community attitudes towards forest resources
	Addressing the uniqueness of each PFM site
	Clearly defining PFM policies
	Recognition of PFM by all stakeholders
	Establishing an office for the CFAs
	KFS establishing programmes that support CFA
	Allocation of responsibilities and roles in PFMP
	Communities made aware that it is their mandate to implement the management plan
	Baseline survey of the resources in the forest should be done before PFM
	Lobby for harmonization of Participatory Forest Management Plan (PFMP) stakeholder policy
	Studying the community members and get their ideas as much as possible on PFM implementation
	Government to set aside funds to the CFAs for the implementation of the management plan
	Continuous capacity building for the stakeholders
	Continuous evaluation of the PFM or the PFMP guidelines
	Communities to come up with IGAs
	Exchange visits/benchmarking of PFMP
	Including forest guards from the community in the management of the forest

enforceable institutional arrangements, for example including forest guards from the community in the management of the forest, was also found to be important in institutional design for collaborative governance [39,15,25,12]. Never the less, it is prudent to argue that all the 52 raised issues in designing institutional arrangements for collaborative governance are important in designing intuitional arrangements for collaborative governance.

5. CONCLUSION

From the results, several issues stand out that are important in the design of institutional arrangements for collaborative governance (Table 2) above. The results also show that the Delphi technique has the potential for studying the institutional design for collaborative governance of forests. The Delphi technique also provides a good platform for identifying important issues in the design of institutional arrangements for collaborative governance of forests. The study recommends that the important issues identified can be used to help in the formulation of collaborative governance institutional arrangement design policy on community-based forests. However, one limitation of this study is that we do not know if the issues raised as important in designing institutional arrangements for collaborative governance can be applied across the world.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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