



# Catalyzing Innovation

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## COMMON-POOL RESOURCE ACCESS RIGHTS AND WRONGS: INSIGHTS FROM GHANA

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## ABSTRACT

Common pool resources (CPRs) such as forests are resources that are available to more than one person and subject to degradation as a result of overuse. Over the years many studies on CPRs have emerged. However, there are still unanswered questions on how best to manage CPRs while correcting the wrongs of abuse and free riding. Using the case of urban forests in Ghana, the focus of this inquiry was to understand the institutional framework for CPR management and also to understand whether resource managers in developing countries employ appropriate tools for the management of CPRs. This article employed the theory of access and institutions to examine the broad range of factors including property rights to land and theft that enable people to benefit from CPRs and abuse them. Our findings suggest that management of CPRs in Ghana is mediated by complex interrelationships between customary and statutory institutions. Different forms of legal (title, lease, deeds) and illegal rights (theft, coercion, violence, deception) characterized access to CPRs.

**Keywords:** Common pool resource, access, institutions and management

## 1. INTRODUCTION

Common-pool resources (CPRs) are resources that are available to more than one person and subject to degradation as a result of overuse (Fischer and Steed, 2007). In essence, in a CPR setting, it is costly to exclude others from accessing the resource, but “one person’s use of the resource subtracts from what is available to others” (Dietz et al. 2002, 18). Examples of CPRs include ground water, ocean and forests. This paper examines one critical aspect of common pool resources—urban forests to understand how institutions are organized for the provision of urban forest resources. We are definitely not the first to assert that urban forest resources especially street trees, parks and gardens may be considered CPRs. Steed and Fischer in 2007 considered street trees as CPRs. Also, Robert E. Loeb in 1987 asserted urban forests might be subject to the tragedy of the commons due to their levels of subtractibility and non-excludability. Urban forests are loosely defined as forests and trees lining municipal streets, derelict corners and abandoned places in urban and peri-urban areas (Cater, 2003).

Urban forests are considered as common pool resources because they are available to more than one person and subject to degradation as a result of overuse (Fischer and Steed, 2007). Although the benefits associated with urban forests and trees can be best considered a public good, primarily, the trees themselves and the spaces on which the trees occupy in urban areas are better defined as CPRs (ibid). Around the world, urban forests and trees provide many benefits, including the reduction of heat island effect or improvement of temperature by providing shade, protection of urban wetlands and watersheds, flood control and storm water management, noise and air pollution reduction, climate mitigation and absorption of greenhouse gasses among others. Street trees are characterized by open access property that many can use them at the same time (especially ecosystem services), because exclusion is difficult (Wade, 1987). Consequently, it has become a daunting task for governments and managers to determine whether a decrease in urban tree population is due to over harvesting, extreme environmental conditions, or both. In Ghana, several studies show that urban forests are declining despite the introduction of some interventions in the urban forestry sector. It is against these backgrounds that this study was undertaken. It puts the issue of urban forests decline on the front burner of development research and addresses the problem statement below from theoretical and empirical standpoints.

## 2. COMMON-POOL RESOURCE PROBLEMS IN GHANA

“Hardly a week goes by without a major news story about the threatened destruction of a valuable natural resource” (Ostrom, 1990, p.1). Degradation of common pools resources such as forests represents a pressing problem in many countries. Recent findings in Ghana for example suggest that over the past decades, forests cover especially in cities is declining (Opoku, 2018). For instance studies show that the Achimota forest in Accra, the capital city of Ghana has reduced from its original size of 500 ha to about 360ha’ due to encroachment (Dumenu, 2013, Opoku, 2018). Daily Graphic report of Ghana also suggests that in Tamale all the three forests reserves in the city have shrunk in size considerably. In the central region of Ghana, Deikumah and Kudom (2010) also reported that the city of Cape Coast had lost most of its forest cover with few trees remaining. In the Ashanti region, the situation is not different, the city of Kumasi, the second largest city in Ghana has lost almost the entire forest cover with few patches or fragments remaining (Opoku, 2018). The loss of urban forests is a threat to human life, which has generated heightened calls for better management (Fischer and Steed, 2007). Despite these calls, many cities lack adequate information on urban forests cover, tree population and dynamics.

In Ghana, forest governance has been a priority on the countries development agenda for decades (Derkyi, 2012). In view of this, may programmes and initiatives have been implemented that has also resulted in changes in national policies and legislation in favour of sustainable forest management (SFM) in Ghana. For instance, in 2001, Ghana introduced the National Forest Plantation Development Programme geared toward improving urban forestry among other objectives in the country (Hoogenbosch, and Ros-Tonen, 2010; Derkyi, 2012). In 2008, Ghana also became the first country in the world to implement the so-called Non-Legally Binding Instrument on all Types of Forest (NLBI) that aims among other things to manage and conserve all types of forests, including urban forest resources. In 2009, Ghana signed the Voluntary Partnership Agreement (VPA) with the European Union (EU) and became the first country to enter into such an agreement with the EU to deforestation by improving regulation and governance in the forestry sector. Currently, Ghana is also implementing the programme to reduce emissions from deforestation and forest degradation (REDD+) which urban forest plays a critical role in maintaining carbon stocks. Despite these many initiatives in the forestry sector of Ghana, urban forest decline has not abated.

It is also difficult to determine how many trees are harvested or destroyed through over harvesting or the tragedy of the commons. Since governments in developing countries have low technology they are also not able to measure with sufficient accuracy the magnitude of the problem of over harvesting of tree resources, nor stop the causes, of deforestation and misappropriation. Therefore they are unlikely to devise appropriate management strategies

that would directly address free riding and appropriation externalities, such as individual transferable quotas. It is against these backgrounds that this study was undertaken. The overall objective is to determine how best to manage CPRs such as urban forest resources while correcting the wrongs of abuse and free riding. Specifically, the focus of this inquiry was to understand the institutional framework for urban forest governance and to explore whether resource managers in developing countries such as Ghana employ appropriate tools for the management of CPR such as urban forests and trees.

### **3. THEORETICAL / CONCEPTUAL FRAMEWORK**

A study into common pool resource clearly demands a conceptual and theoretical framework to guide the empirical and analytical aspects of the study. Theoretically, the study reviewed the concept of urban forestry and common pool resources and linked them to the theory of access and institutions. Access has been among the most important topics when studying social aspects of common pool resources (Ostrom, 2002). The extensive literature on access shows that different means, relations, and processes enable various actors to benefit from resource. In next section, we provide a definition of access and discuss a working set of categories and mechanisms that shape peoples benefit to common pool resources. The first of these categories is rights-based access sanctioned by law, custom or convention, including illegal access or theft when actors derive benefits through illegal means. The second of these categories include a wider range of structural and social relations that constrain or enable benefits to be obtained from resources. These include capital, market, labour, authority and other social relations such as friendship and ethnicity (Ribot and Peluso 2003, p.153).

Conceptually, the study reviewed and used Institutional Analysis and Development (IAD) framework (Ostrom et al. 1994) for the study. The IAD framework, developed by Elinor Ostrom and her colleagues, is one useful framework that has seen application in a wide range of collaborative effort studies. According to Ostrom (2006:22), the framework has ‘influenced the analysis of a diversity of resource management questions including how institutions are organized for the provision of public goods including the production of urban policing and education, primary health care, fertilizer, coffee, roads, irrigation, fisheries, forest resources, and common-pool resources more generally’. The framework emphasises the importance of rules and regulations in managing resources and determining the outcomes of collaborative efforts. It ‘draws the analyst’s attention to the interaction between rules and individual decision making as well as the interactions of these variables with aspects of the physical world and community culture’ (Koontz, 2006: 16).

The framework could be applied in different cases studies and at three levels of action namely, operational, collective choice and constitutional choice (Koontz, 2003). Koontz

(2003) defines the operational level as the day-to-day activities of actors, the collective choice level as where decision makers make rules to influence operational level activities, and the constitutional level as where decision makers determine how collective choice participants will be selected and how they will relate to each other. A useful attribute of the framework identified by Koontz (2003) is that it allows the analyst to make comparisons and evaluations of resource management situations. In the past decades, the IAD framework has proved useful in the analysis of CPRs in many ways. Groenewegen (2010) accredited the philosophical foundations of the IAD framework to earlier works by the renowned Vincent Ostrom on self-governance. First described by Kiser and Ostrom (1982); the IAD framework established the basis and importance of several external and internal factors that shape institutional outcomes in resource management situations. These factors according to Mincey (2012) include the so-called biophysical factors or nature of the resource, the attributes of the community where the resources in question is located, and the rules in use where the resources are located or rules establishing action situation from which, outcomes are produced.

The IAD framework describes three specific types of rules (so-called rules in use) that one must explore in institutional analysis of common pool resources: These rules are operational rules, collective choice rules, and constitutional rules operating at different levels at the place where the resources are located. At the operational level is the basic level where day-to-day activities takes place. The collective choice level is the second and slightly higher level than operational level, where decision-makers create rules that impact operational level activities. Hence these aspects were considered as the components of the conceptual framework for this study. One weakness of the IAD framework is the neglect of rules that are not in use at where the resources are located.

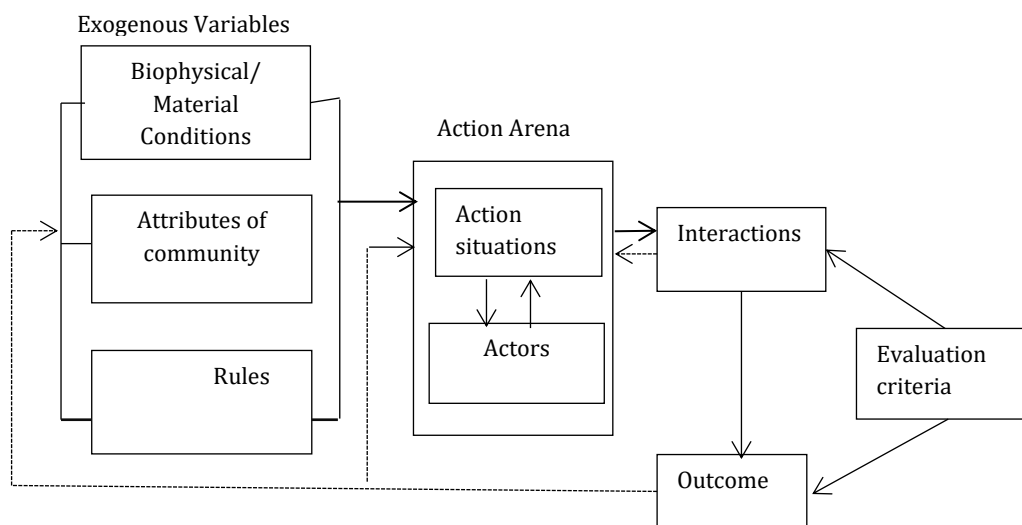


Fig. 1 Basic components of the IAD Framework (Ostrom, 2005 p.15)

#### 4. STUDY CONTEXT, DESIGN AND METHODS

We adopted an embedded case study research design and approach with the case study area being the city of Kumasi (see Figure 3). An embedded case study approach was adopted to allow for an in-depth exploration of the complex socio-political interactions among institutions and citizens in the use and management of urban forest resources. The city of Kumasi is the second largest city in Ghana with a population of over 2million people. Kumasi is located in the Southern part of Ghana and falls under the wet sub-equatorial vegetation type (See figure 4). The Kumasi urban area is located between latitude 6°35” – 6°40” (about 270 km north of Accra) and longitude of 1.30° – 1°35”, comprising a total land size of 254 square kilometres (KMA, 2006; Adarkwa, 2011). The climatic conditions of Kumasi support tree growth. Tree species commonly found in Kumasi include: *Ceiba pentandra*, *Triplochiton scleroxylon* and *Tectonia grandis* (KMA, 2010). Data for the study were collected using literature review, field observations, semi structured interviews and document analysis. In all, a total of 17 representatives from organizations involved in urban forestry were interviewed. In addition to this, 40 key informants were also interviewed in the study area. Qualitative data gathered in the study were analysed using content analysis. The results are discussed in the next section of this article.

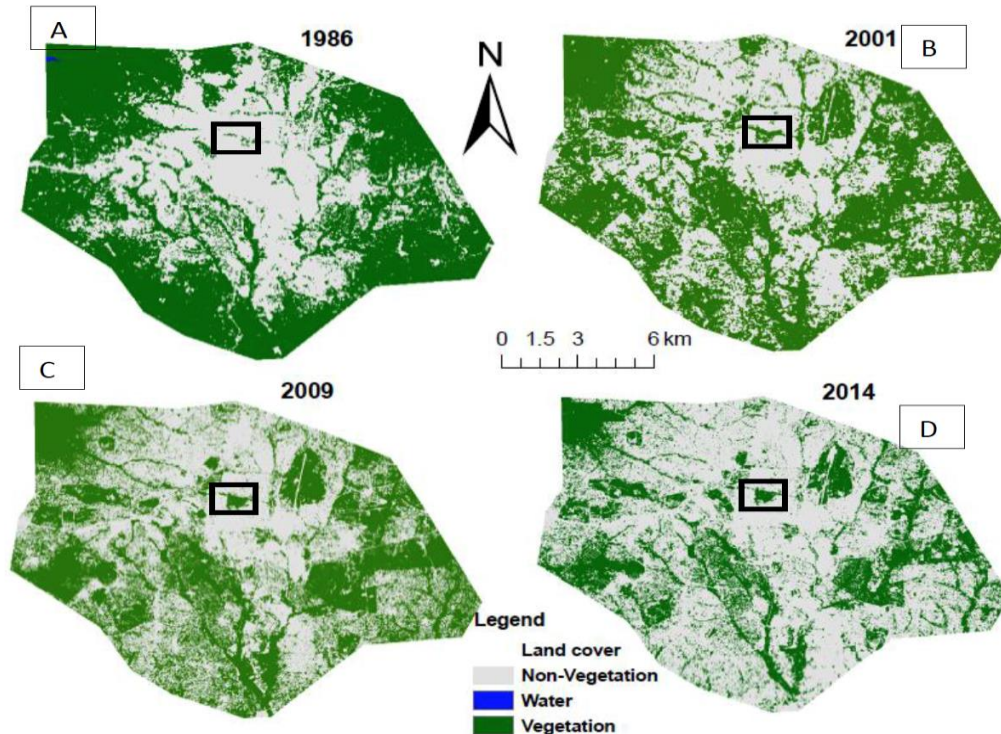


Fig. 2 Urban land cover maps (A - D) for four different years in Kumasi

The map shows the pattern of land cover change in Kumasi for 28 years. The black squares show an example of forest gain in Kumasi within the 28years (Nero 2016, p. 39). The share of urban forest on vegetation in Kumasi is estimated at 520 ha (KMA, 2010)

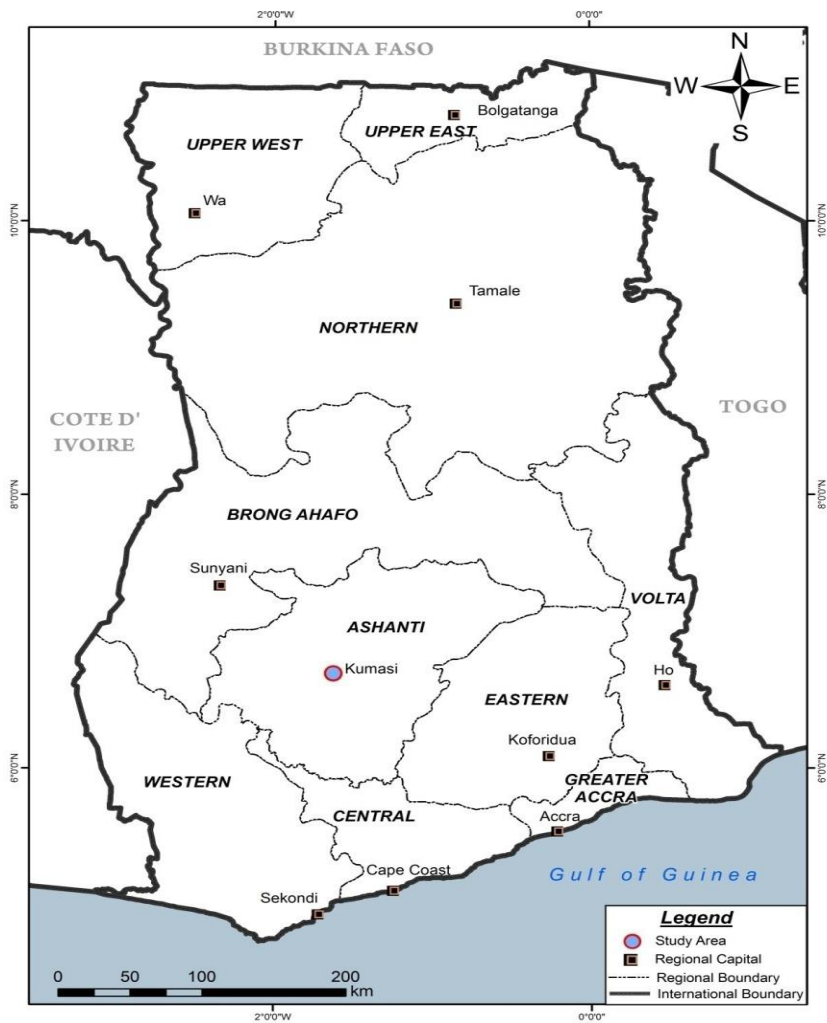


Fig. 3 Map of Ghana showing the location of Kumasi

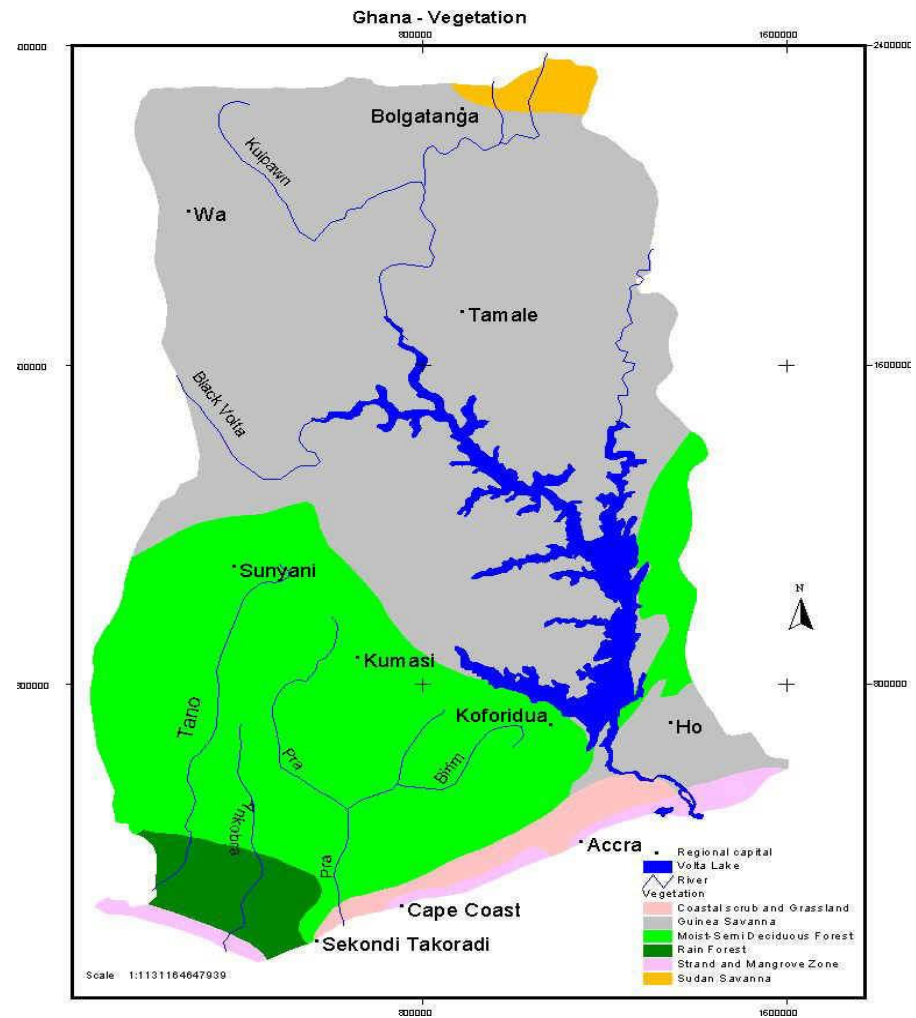


Fig. 4 Map of Ghana showing various vegetation zones (Mensah, 2015)



## **5. RESULTS AND DISCUSSIONS**

This section presents the findings of the study. First it explores the link between CPRs and urban forest resources and the reasons why urban forests are considered as CPRs in many settings. The section also presents findings of the institutional framework for urban forests management in Ghana as well as the strategies employed by resource managers for urban forest management. Issues of access rights and the tragedy of the commons are also explored adequately in this section. The section concludes with a recommendation for policy makers and practitioners.

### **5.1 EXPLORING THE LINK BETWEEN CPRs AND URBAN FOREST RESOURCES**

As a step in understanding how urban forests are related to CPRs, this section provides findings of the pertinent literature dealing with each subject (see e.g. Fischer and Steed, 2007). CPRs are defined as “resources that is available to more than one person and subject to degradation and abuse as a result of overuse.” (Dietz et al., 2002, p.18). In other words, CPRs are costly but not impossible to exclude others from accessing the resource and “one person’s use of the resource subtracts from what is available to others” (ibid). Thus, CPRs are characterized by two concepts: excludability and rivalry in consumption (Fischer and Steed, 2007). Urban forest on the other hand has been defined in many ways. In this paper, we can point to a broad definition in which the term urban forest comprises the totality of trees in both urban and peri-urban areas (Harris et al., 2004; Miller, 1997; Miller et al., 2015) and a narrow definition in which the urban forest is defined as a collection of trees in parks and preserves in an urban area (Mincey and Fischer, 2013). By extension then urban forestry is defined as the management of trees and its ecosystem resources for human wellbeing (Miller, 1997; McPherson, 2000, Opoku, 2018), whereas urban forest governance is defined as the structures, rules and processes shaping human decision about urban forestry development (Lawrence et al., 2013). The link between urban forests and CPRs has been heavily debated in scientific literature (See e.g. Loeb 1987; Mincey 2012; Watkins, 2015).

Whereas a researcher like Watkins (2015) see urban forest as public goods, other researchers such Mincey and Loeb see urban forests as common pool resources. Literature shows that urban forestry is multifaceted and multidisciplinary, cutting across several disciplines and involving not only foresters but a wide range of stakeholders (Grey and Deneke, 1986; Konijnendijk et al., 2006). Urban forestry also comprises a wide range of habitats and landscapes; for example streets, parks, gardens and abandoned areas or derelict corners (Grey and Deneke, 1986; Watkins, 2015). It contributes to human wellbeing by reducing heat island effect, rain and windstorms, flooding and many other natural disasters and catastrophe. Several years of empirical research have revealed many complications in commons

management that could be termed Hardin's tragedy or McCay's comedy (Ostrom et al., 2002). However, over the years there has not been clear distinction between common pool resource and urban forests in general. In Ghana especially street trees shares two important attributes of CPRs that is worth mentioning. These two attributes are (1) the difficulty of excluding individuals from benefiting from it, (2) Subtractability of the benefits consumed by one individual from those available to others. Let us discuss these attributes.

## 5.2. SUBTRACTABILITY AND DIFFICULTY OF EXCLUSION

Street trees and tree spaces in Ghana present the most common type of CPRs. This study found out that the location of street trees in urban settings makes them difficult to exclude people from benefiting from the resource (see e.g. Fischer and Steed, 2007). In urban areas like Kumasi, street trees are located near public rights of way and sidewalks, which makes them difficult to manage collectively. In many cases, they are contained within the public right of way. Public access to these areas is often guaranteed through easement or other legal means. When tree spaces reside in the public right of way, the public has open access to them. While it is theoretically feasible to consider excluding individuals from the trees or tree spaces, it would generally be prohibitively costly to do so. The table below (Table 1) show some characteristics of urban forestry that makes them appear to be a common pool resource. Street trees in particular are highly subtractable and difficult to exclude potential users.

Table 1. Characteristics of urban forests that makes it a common pool resource

Level of Subtractability			
		High	Low
Difficulty of exclusion	High	Common-pool resources (e.g. street trees)	Public goods (e.g. public parks with trees)
	Low	Private good (e.g. private trees)	Toll good (E.g. private parks with trees)

Source: Adapted from Ostrom, 2005, p.24

A growing number of empirical and theoretical studies suggest that the “success” of a resource depends largely upon whether the good is a private good, toll good, public good or common pool resources more generally (Polski and Ostrom, 1999, Opoku, 2018). In Kumasi urban forests can be a public good, private good, common pool resources or toll good depending on the property rights to the land. When trees are located on private lands, they are private good and when trees are on public lands they can be termed public good.

### **5.3 URBAN FORESTS MANAGEMENT IN KUMASI, GHANA**

Managing CPRs has been a daunting task for many governments across the world. The role that institutions play in CPR management cannot be underestimated in this paper (see e.g. Opoku, 2018). Institutions defined as the rules of the game or norms and strategies that shape human decision-making have been at the centre of academic debates for sometime now. Mincey (2012) argues that institutions have received less attention in for example urban forest management despite their role in solving common pool resource problems. As Mincey (2012, p.19) noted, a more in-depth analysis of institutions in urban settings is not only important for socio-ecological systems but promises to help answer questions of why and how individuals are incentivized to either conserve or remove urban trees in the face of declining urban forests resources. In the analysis of management of CPRs in Ghana, a focus on institutions is paramount because institutions (rules and regulations) have been found to avert many of the problems that CPRs face. Institutions are necessary since urban forests exhibit characteristics of common pool resources (CPRs) as demonstrated by many researchers including Loeb (1987), Lant et al. (2008), Fischer and Steed (2008) and Mincey (2012).

Without well functioning institutions and proper management, CPRs (such as urban forest) are subject to degradation due to their difficulty of exclusion and high levels of subtractibility as noted by Hardin in his previous studies on natural resource management (McKean, 2000; Mincey, 2012). Several strategies have been outlined for management of CPRs across the world, which include privatization and collective action. Despite Hardin's (1968) scientific debates that privatization or government control can solve CPR problems; his argument is well suited to open-access situation where resource users or actors have no affiliation with one another (Ostrom, 1990). According to Fischer and Steed (2008), three management approaches are commonly used in CPR settings distinct from open access regime described by Hardin. The three management approaches include; (1) government management of public property where government control both access and allocation rights, (2) private management of common property where access and allocation rights are held by private entities, and (3) collective management of common property where rules often propagated by local communities establish communal access and allocation rights (also see Steins and Edwards, 1999).

In Ghana resource managers employ different approaches for CPR management. These sometimes include government management or controls, privatization and collective management by key stakeholders. Even though this study has found out that there hasn't been any proper stakeholder analysis for urban forests in Ghana, however several organizations can play a role in the management, planning, financing, conflict resolution and monitoring of urban forests resources. Our findings suggest that identifying stakeholders is necessary in

order to understand management strategies and societal interest to support the decision-making process and to enhance governance of the common pool resources. Therefore, a stakeholder analysis was done to identify a list of stakeholders and tools or strategies that can be used for the management of urban forests resources (Figure 5). Unfortunately, in Ghana the study found that resource managers or stakeholders do not use these tools appropriately.

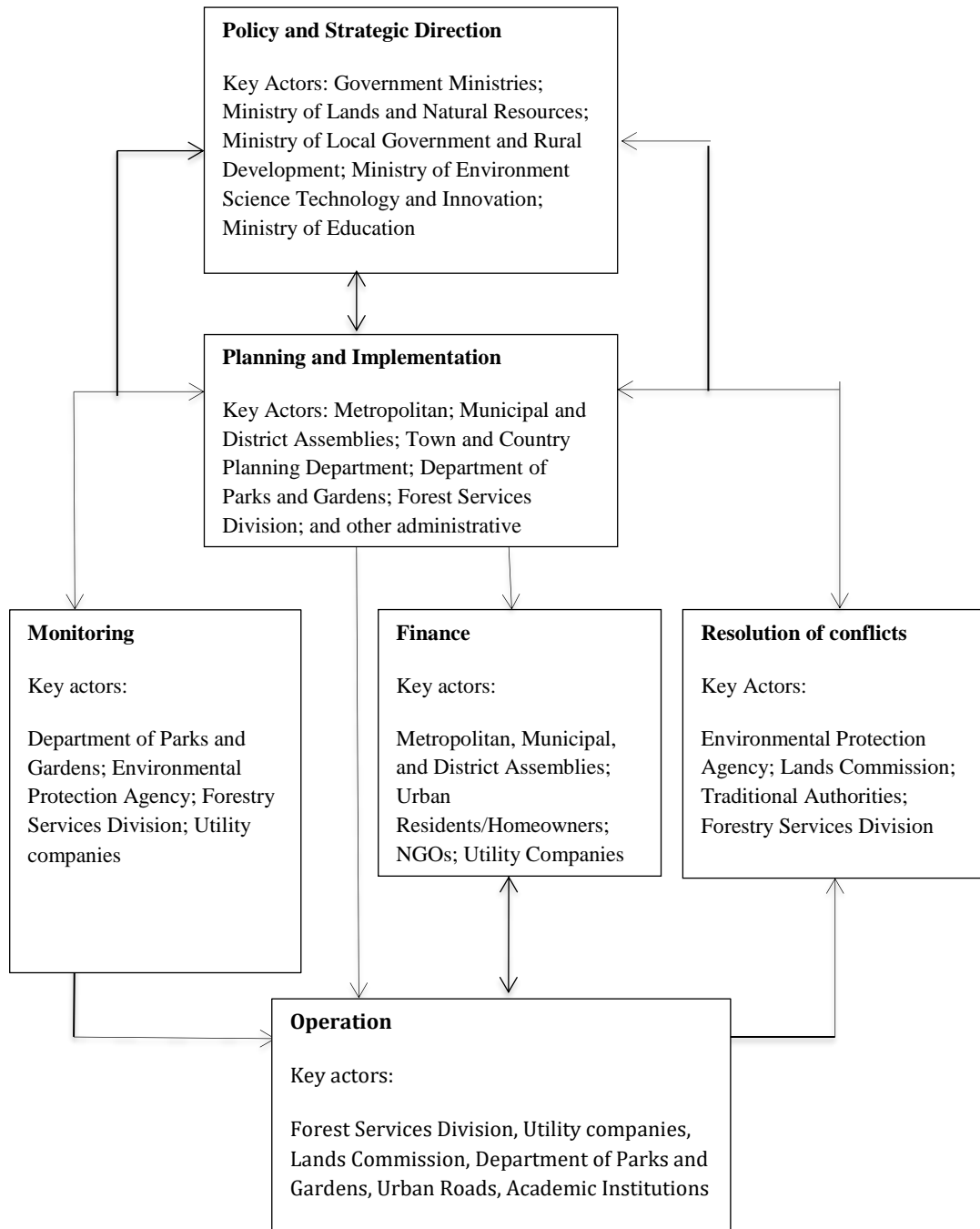


Fig. 5. Stakeholders and tools for the management of urban forests resources

In addition to the stakeholder analysis, this study attempted to understand design principles common to successful CPR or urban forest management. For the purposes of this paper, we will briefly discuss the design principles established by Ostrom (1990) after extensive investigation and comparison of CPR management. These principles according to Ostrom are; (1) clearly define boundaries; (2) clearly define rules that meet local needs, (3) ensuring that those affected by the rules can participate in modifying the rules, (4) respect for rule-making rights of community members by outsiders, (5) monitoring of members' behaviour using developed systems by community members, (6) graduated sanctions for rule violators, (7) access to low-cost means for dispute resolution and (8) nested enterprises. Since the focus of this paper was to understand whether resource managers in developing countries employ appropriate tools for the management of CPRs. This article used several case studies in Kumasi, Ghana to examine the principles employed by resource managers that leads to successful management outcomes.

Using the IAD framework, design principles of six urban forests landscapes in Kumasi were analysed by examining their physical characteristics, the community attributes, the patterns of interactions and the rules-in-use leading to outcomes (see e.g. Polski and Ostrom, 1999). The results were then discussed with insights from common property theories. After the analysis, the study found out that the city of Kumasi has different rules and regulations managing urban forests landscapes (see Table 1). While for instance access is controlled in some public parks and gardens (e.g. Rattary park and the Royal park), in some places access was free (e.g. Kumasi children's park). These differences in rules and regulations affected the outcomes of management with some parks in good shape whereas others were highly degraded.. This confirms Hardin's tragedy of the commons. Different forms of interactions were observed. Interactions between actors in this study were evaluated based on the criteria adopted from Helmke and Levitsky (2004) and Osei Tutu, et al. (2015).

Complementary institutional interactions, a situation where two or more formal institutions come together to achieve a common goal, were observed at the Kumasi Zoological gardens whereas institutional void a situation where both formal and informal institutions were ineffective was observed at the Kumasi children's park, which has been abandoned for years. A substitutive interaction where formal rules were not routinely enforced and state structures was weak or lack authority was observed at the Adehyeman gardens leading to its degradation (Table 2).

Table 2. Institutional analysis of six urban forest landscapes in Kumasi

IAD Domain	KNUST Botanical Gardens	Kumasi Children's Park	Kumasi Zoological Gardens	Rattary Park	Royal park	Adehyeman Gardens
<i>Physical and material condition</i>	Well fenced property, owned by a public university, opened to the public	Poorly fenced property, owned by the state for public good	Well-fenced property, owned by the state for public good	Well fenced property, owned by the state for public good	Club good. Well-fenced property, open to members of the golf club	Poorly fenced property, conflicts over ownership rights
<i>Community attributes</i>	Located in a public university close to a third class heterogeneous community	Located in Asokwa, a second class heterogeneous community	Located in the central business district of Kumasi. Heterogeneous community	Located in a Nhyieaso, a first class heterogeneous community	Located in Nhyiaeso, a first class heterogeneous community	Located in the central business district of Kumasi
<i>Rules-in-use (operational rules)</i>	Formal rules are effectively enforced. Felling of trees prohibited	Formal rules are not effectively enforced, free riding, no control	Formal rules are effectively enforced. Hunting and felling of trees are highly prohibited	No smoking, no camping, no animals are allowed in the park	Open to members of a club, membership dues are required	Formal rules are not effectively enforced, public control is of a low priority
<i>Action Arena</i>	Regular patrol and monitoring, access fees are charged	Open access, no specific action is taken in the park	Regular patrol and monitoring, access fees are charged	Regular patrolling, access fees are charged	Regular patrolling and monitoring, access fees charged	No monitoring, conflicts over property rights to the land
<i>Patterns of interactions</i>	Complementary institutional interactions between key actors	Institutional void. Both formal and informal institutions are ineffective	Complementary institutional interactions between key actors	Competing interactions between key stakeholders (e.g. KMA and Lands Commission)	Substitutive institutional interactions. The club achieves what formal institutions failed to do	Substitutive institutional interaction. Formal rules were not routinely observed
<i>Outcome</i>	Property in good shape	Property damage, free riding and encroachment	Property in good shape	Property in good shape	Property in good shape	Encroachment, property used for commercial activities

Source: Opoku, 2018

#### 5.4 COMMON POOL RESOURCE ACCESS RIGHTS

The question of how people get access to common pool resources such as forest and benefit from them has been at the centre of academic debates for sometime now. However, the theory of access has not been applied adequately in such discussions. Here we employ the theory of access as a framework to understand these complexities. Access is defined as the “ability to benefit from things” and the theory of access suggests a host of mechanisms (so-called means), including property rights and theft, through which benefits may be obtained from natural resources (Ribot and Peluso, 2003). Taking common pool resources such as urban forest (especially street trees) as the thing in question, the reason for applying the access theory in this paper is to understand how and why people get access to urban forests resources and abuse them. In the context of common pool resources access is about all possible means by which a person is able to benefit from things. In the study of common pool resources, the theory of access has become important especially since access holds a double edge in the sense that one actor’s benefit of a common pool resource is another actor’s exclusion (Hall et al., 2011). In postcolonial society in Ghana, characterized by legal pluralism many actors use different laws and resources to gain control and maintain access to resources, and thereby excluding others from the benefits. When actors get access to resources they attempt to consolidate their claims or hold on to the resource by trying to turn their access rights into recognized property (Berry, 2002). In this study, we found out that the depletion of urban forests landscapes in Kumasi has a lot to do with property rights to land, markets, capital and other structural mechanisms such as labour, friendship and authority.

In Ghana, different forms of institutions (e.g. customary and statutory) compete to recognize various claims to resources (Sikor and Lund 2009: 10). Hence, a struggle over common pool resources has a lot to do with power and authority as they are about access to resources (Sikor and Lund, 2009). In many common pool resource situations, powerful actors with adequate resources are able to benefit from the resources more than less powerful actors. The opposite is equally important. Established rights by powerful actors may still whittle away if rights holders are not capable of securing and entrenching them. Typically, powerful actors in the society may undermine and eliminate the rights of other actors through various means of dispossession including legal pluralism and forum shopping (Sikor and Lund, 2009). In the Ghanaian context the country operates a land tenure system characterized by legal pluralism where customary and statutory laws compete in a complex mix over resources (see e.g. Djokoto and Opoku, 2010). The co-existence of (2) customary and statutory laws and/or institutions has enable or disable different actors to gain control and maintain access to urban forest landscapes contributing to their degradation. In order to maintain access, benefits in the form of taxes, rent and dues are sent to those who control access.

## **5.5 COMMON POOL RESOURCE ACCESS WRONGS**

Common pool resources such as urban forests in Ghana are affected by many wrong activities that contribute to their depletion. For example street trees in Ghana compete on daily basis with other commercial activities for space due to land ownership and unclear property rights to land. People are emboldened to remove street trees and use the space for commercial activities with impunity that goes unpunished. Depletion of urban forest landscapes is enhanced by complex interrelationships between customary and statutory institutions competing in complex mix over land resources. As indicated earlier, Ghana operates a land ownership and tenure system supported by different laws or legal pluralism that creates problems for urban land management (Opoku, 2018). Over 80% of all lands in Ghana belong to chiefs and traditional authorities that create problems for collective management of natural resources. The co-existence of customary and statutory laws and institutions creates problems for urban forest management in the way that many laws contradict each other. In the Ghanaian context, this study observed that different laws enable different actors to gain control and maintain access to land resources. These laws include, the State Land Act, 1962 (Act 125), State Land Regulation 1962 (LI 230), Land Registration Act 1962 (Act 122), and the Administration of Lands Act, 1962(Act 123). Beside these laws, legal means (right based way) constitute only part of access mechanisms amongst many other factors by which people gain, control, and maintain access to urban forest land resources. Other means including violent evictions and theft (rights-denied mechanisms of access) as observed in the study area in Kumasi also characterized access to resources. In addition, economic factors such as poverty also drives people to take over urban forest resources through illegal means such as theft as witnessed among traders who have taken over streets in Kumasi for commercial activities.

The competition for space leads to a tragedy of the commons situation where unregulated access to land resources leads to depletion of street trees. The abuse of access rights to land by actors is one example that leads to the tragedy of the commons. The tragedy of the commons is a term popularly used in social science and by economists to depict a wrong situation in common pool resource use where actors or individuals using a shared-resource system such as forest and land act independently and selfishly to destroy and deplete the resource contrary to common good. Developed in 1833, the tragedy of the commons concept uses several hypothetical examples of the effects of unregulated grazing on common land in Great Britain and Ireland to explain how unregulated resources can be depleted (Lloyd, 1977; 1833). The concept became more popular during the work of the American ecologist and philosopher Garrett Hardin (Hardin, 1968). One of the important contributions of the past 30 years of research into common pool resources has been to clarify the concepts involved in the tragedy of the commons. Today, the tragedy of the commons has become a central concept in



the study of common pool resources such as forests and land in cities. Each user of a common pool resource faces a decision about how much of the resource to use before others deplete it (Ostrom et al., 1994; 2002). If all users behave well, then the resource can be sustained. But according to Ostrom et al (2002), there is a dilemma and this dilemma arose due to the fact that when one person limits the use of the resources and his/her neighbours does not, the resource will still collapse leading to a loss of the short-term benefits. The logic of the tragedy of the commons fit well with the problems that urban forestry faces especially street trees in Ghana. For street trees the logic depends on three sets of assumptions that relates to (1) human motivation to use the resource, (2) rules governing the use of the resource, and (3) character of the resource. For urban forestry in Ghana, things are not as simple as they seem in the other common pool resources. Human motivation to protect urban trees especially street trees is complex, while the rules governing urban forestry in general are not always clear and enforced. Moreover, many problems and constraints (see Table 3) confront the land sector that has consequences for the sustainability of common pool resources such as urban forests in Ghana.

Table 3. Challenges confronting access to land in Ghana

1. General indiscipline in the land market characterized by land encroachments, multiple sales of land parcels and unapproved development schemes.
2. Indeterminate boundaries of lands resulting directly from the lack of reliable maps/plans.
3. Inadequate security of land tenure due to conflicts of interests between and within land-owning groups and the state.
4. Weak land administration system characterised by out-dated legislation
5. Conflicting land use
6. Lack of coordination between land sector institutions and agencies
7. Poor defined property rights to land
8. Lack of proper documentation and digital solutions to land management
9. Ineffective decentralization programme in Ghana
10. Corruption
11. Political interference
12. Lack of human and financial resources for management
13. Ambiguous delineation of land property rights to chiefs and traditional authorities
14. Unfavourable lease arrangements over land
15. Piecemeal approach to land sector problem solving

## 5.6 CONCLUSIONS AND RECOMMENDATIONS

It is easy for the developed world to conclude that developing countries do not manage common pool resources such as urban forest properly, because access and property rights to land are not clear. Moreover, rules are not properly enforced whereas monitoring arrangements also seem very informal and confusing. However, it is only a fallacy that if government is not managing CPRs, then great inefficiency must be occurring. At least in the city of Kumasi this study has shown that government management of urban forests resources do not always yield efficiency whereas privatization does not always lead to successful outcomes. In general, lack of enforcement of rules and monitoring pose a big challenge to urban forest development. Successful institutional solutions to the governance of urban forest resources will depend on rules enforced by state institutions. Rules that can solve not only appropriation problems but also control externalities related to the use of the resources. These may include; (1) boundary rules that limit uncontrolled access to land and forest resources, (2) authority and scope rules that specify how much of what type of land should be reserved for forest resources and (3) payoff rules that empower monitoring, sanctioning and arbitration.

As developing countries move towards sustainable development, and perhaps towards more democratic government, it is important that collective action is not be ignored. The critique of three popular collective action theories, combined with empirical knowledge of the conditions in which the users of common-pool resources have established arrangements to prevent over-use, suggest a number of factors on which successful collective action depends. To spell it out in more detail, the likelihood of successful CPR management depends on the following: (1) smaller and more clearly defined boundaries that are protected by the state, (2) investment in exclusion technology such as fencing that yield better chances of success, (3) clearly define rules that meet local needs, (4) ensuring that those affected by the rules can participate in modifying the rules, (5) monitoring of members' behaviour using developed systems by affected community, (6) graduated sanctions for rule violators or punishments against rule breaking, etc. These principles of Ostrom if applied in the context of urban forests in Ghana will yield benefits to avert degradation. The extent to which users are bound by mutual obligations, the more likely that promises entered into will be kept for better management of the resources. Other recommendations worth mentioning in our study include the need for government to create land banks for urban forestry development in Ghana (e.g. in Bolivia), protect the land banks by registering titles to the land, the need to have freehold (but not leasehold) access to land. Government must regulate anthropogenic activities in and around urban forest areas as well as allocate forest user rights to urban citizens for greater citizen participation.

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