

The role of mapping in enhancing collaboration and decision-making processes around urban natural assets: a case study of Lilongwe, Malawi

A thesis submitted to University of Cape Town for the degree of Master of Philosophy in Environment, Society and Sustainability

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Abstract

The role of collaborative urban planning approaches in addressing wicked problems and fostering climate resilience is receiving growing attention. Strong and robust governance systems, that value collaboration, are likely to contribute to managing the complex challenges African cities face. Collaboration in urban planning presents an opportunity for engaging numerous state and non-state actors to work towards more robust and durable solutions for cities. There are various factors and mechanisms that can be adopted and used in cities to encourage effective collaboration in urban planning. Maps are one such mechanism. Maps can firstly, be used to facilitate collaboration and open up conversation amongst people and secondly, can be used to analyse and understand the city.

Through ICLEI Africa's Urban Natural Assets: Rivers for Life (UNA Rivers) project, urban planners and environmental officers from Malawi's Lilongwe City Council identified the need to better incorporate urban natural assets in Lilongwe City's city planning processes. This thesis aimed to determine how the process of collaborative mapping of urban natural assets might contribute to collaborative governance between state and non-state actors in the City of Lilongwe. In order to fulfil this aim, there were three objectives: a) to assess the steps and process employed in the collaborative urban natural asset hotspots mapping process; b) to investigate the role, experiences and perceptions of the actors involved; and c) to examine how and to what extent the collaboratively produced urban natural asset hotspots map has been able to inform urban planning and foster collaborative governance.

To meet these three objectives this study drew on existing documents relating to the collaborative mapping process, in-depth, semi-structured interviews with targeted participants and a focus group discussion with the UNA Rivers project team members from ICLEI Africa. The results indicate that the steps in the collaborative mapping process were influenced by various factors. Firstly, the selection of participants was strategic and targeted to include key individuals who worked in departments pertaining to city planning and environmental decisions. Secondly, the data collection process undertaken to locate and map the urban natural asset hotspots in Lilongwe was influenced by the limited GIS capacity within the Lilongwe Council, which resulted in the appointment of a consultant from Conservation Research Africa by ICLEI Africa to undertake the data collection and GIS mapping process. Several conditions were found that enhanced participants' experience of the collaborative mapping process. These conditions, included flexibility in role and responsibilities of actors; the inclusion of diverse stakeholders and opinions; keeping the numbers of participants in a collaboration to a manageable size; the opportunity to build relationships and trust. The visual representation of the urban natural asset in the form of a map was well received. However, despite the numerous benefits of the collaboratively produced urban natural hotspots map, participants listed a number of reasons

that it was not used extensively. These reasons include outdated city planning laws and regulations that do not refer to the map; politics surrounding the enforcement of these laws and regulations even if they were to be updated; the lack of capacity, especially in the GIS department, in order to update the maps; Lilongwe city does not have ownership of land meaning there are often intimidation tactics by developers; and limited funding to implement and mainstream the map in decision making processes. However, while the actual map might not be used to its full potential, the collaborative process changed the way certain decisions are being made in the Lilongwe City Council, especially in relation to city planning practices. This in itself is a noteworthy outcome and showcases the value of maps in aiding collaborative governance.

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Chapter 1: Introduction

1.1. Introduction

Globally, there is increasing focus on the role of collaborative urban planning approaches to address wicked problems and fostering climate resilience (Baird, Plummer & Bodin, 2016; Barton et al., 2015; Borie et al., 2019a; Broto, Boyd & Ensor, 2015; Emerson & Murchie, 2010; Mensah et al., 2017). Urban planning is one vehicle to addressing structural vulnerabilities in urban areas as well as the interrelationship between climate change vulnerabilities and other aspects of the urban condition (Broto et al., 2015). This is particularly true for African cities which are characterised by rapid urbanisation, high rates of population growth, and weak management institutions. Coupled with increasing vulnerability to the impacts of climate change, these complex challenges require African cities to have strong and robust governance systems that value collaboration (Broto et al., 2016; Guneralp et al., 2017; IPCC, 2018).

Among others, collaboration in urban planning presents an opportunity for engaging various interests from numerous state and non-state actors to work towards more robust and durable solutions for cities (Emerson & Murchie, 2010). There are various mechanisms that can be adopted and used in cities to encourage effective collaboration across diverse stakeholder interests and perceptions to enhance collaborative governance. Maps are one such mechanism. Maps can firstly, be used to facilitate collaboration and open up conversation amongst people, and secondly can be used to analyse and understand the city (Borie et al., 2019a; Dovey & Ristic, 2015, MacEachren, 2000).

Through ICLEI Africa's Urban Natural Assets: Rivers for Life (UNA Rivers) project funded by SwedBio, urban planners and environmental officers from Malawi's Lilongwe City Council identified the need to better incorporate urban natural assets in Lilongwe City's city planning processes. Natural assets can be defined as environmental systems, such as wetland, river, coastal and estuarine systems, that produce a flow of beneficial goods and services to life on earth over time (Barbier, 2009). During the initial discussions between ICLEI and the City of Lilongwe, it was decided that an urban natural asset hotspots map needed to be collaboratively developed in order to a) identify and delineate key natural assets in and around the city of Lilongwe, and b) assign priority statuses to each in order to guide both city planning and development decisions in a manner that protects key natural assets. Over a 12-month period, town planners and environmental officers collaborated to create an urban natural hotspots map using input from independent researchers whenever necessary (ICLEI CBC, 2019).

In addition to the UNA Rivers project this study also draws on and contributes to the Improved Municipal Planning in African Cities for a climate resilient urban future (IMPACT). The IMPACT

project is a three-year research collaboration implemented in Zimbabwe and Malawi. The project is investigating how enhanced collaboration mechanisms in municipal planning in African cities might enable climate resilient development (ICLEI Africa, 2020). Through both projects increasing attention is being placed on the role of collaborative process in enhancing urban planning decisions and practices in Africa cities. For example, through the UNA Rivers project the collaborative mapping of urban natural assets in cities is gaining traction in other cities, such as Kampala, yet there has not been an in-depth analysis of this collaborative approach and its outcomes.

In light of this, the aim of this study is to determine how the process of collaborative mapping of urban natural assets might contribute to collaborative governance between state and non-state actors in the City of Lilongwe. In order to fulfil this aim, there are three objectives:

- a) To assess the steps and processes employed in the UNA Rivers project collaborative mapping process related to urban natural assets in Lilongwe.
- b) To investigate the role, experiences and perceptions of actors involved in the collaborative mapping process regarding its usefulness for knowledge sharing and learning, practical application and further interaction and cooperation.
- c) To examine how and to what extent the collaboratively produced urban natural asset hotspots map has been able to inform urban planning and foster cross-sector collaborative governance in Lilongwe.

1.2. Thesis outline

This thesis consists of 5 chapters. **Chapter 1** begins by presenting an overview of the study highlighting the aim and objectives of the study. This is followed by a theoretical overview of collaborative governance and urban planning and the value of collaborative mapping in **Chapter 2**. The study area context is also outlined in this chapter. **Chapter 3** provides a detailed description of the study methodology, which includes the data collection and data analysis undertaken as well as the limitations and ethical considerations relating to the study. **Chapters 4 to 6** focus on the results and discussions of the study. More specifically, **Chapter 4** presents and discusses the results relating to objective a) understanding the steps and processes employed in the collaborative mapping process of urban natural asset hotspots in Lilongwe. The results and discussion relating to objective b) investigating the roles, experiences and perceptions of the actors involved in the collaborative mapping process are highlighted in **Chapter 5**. Following this, **Chapter 6** presents and discusses the results relating to objective c) unpacking how and to what extent the collaboratively produced urban natural asset hotspots map has been able to inform urban planning and foster cross-sector collaborative

governance in Lilongwe. The final words are covered in **Chapter 7**, which presents the concluding remarks of the study as well as suggestions for future research.

Chapter 2: Theoretical overview and study area context

2.1. Theoretical Overview: Collaborative governance and urban planning

In recent decades, there has been a shift away from top-down rationalist approaches to urban planning, where only a few selected government officials and experts are involved in decision-making processes, to a more participatory and collaborative governance approach that includes a wide range of stakeholders (Majale, 2008; Mensah et al., 2016). Collaborative governance approaches are increasingly being seen as more suitable to addressing the ‘wicked’ planning challenges many cities face today (Mayer & Kenter, 2015: 44). Mayer and Kenter (2015: 44) stated that urban planning challenges are in and of themselves “wicked problems” as they often entail a lot of uncertainty, interdependencies and even conflicting positions (Baird et al., 2016). Collaborative governance is increasingly being seen as a way to address wicked planning problems that might be too difficult for any entity to address on its own. However, the definition of collaborative governance still remains broad in scope (Baird, Plummer & Bodin, 2016; Donahue, 2004; Emerson et al. 2011, Mayer & Kenter, 2015; Nabatchi & Balogh, 2012). Before unpacking the concept of collaborative governance, it is essential to first look at the broader concept of governance.

There are various interpretations and definitions of the term governance and, more specifically, collaborative governance. Collaborative governance is considered to be one mode of governance (Ansell & Ghoshal, 2007: 545). Generally speaking, governance refers to the “act of being governed” (Emerson, Nabatchi & Balogh, 2011: 2). According to Stoker (2004, 3), governance refers to “the rules and forms that guide collective decision-making. That the focus is on decision-making in the collective implies that governance is not about one individual making a decision but rather about groups of individuals or organisations or systems of organisations making decisions.” This is echoed by Bevir (2011:2) who notes that collaborative governance, amongst other features, brings together a diverse group of people into a collective decision-making process. Collaborative governance builds further on this idea of collective decision-making.

There are various definitions of collaborative governance. Emerson et al (2011: 2) refers to collaborative governance as “the processes and structures of public policy decision making and management that engage people constructively across the boundaries of public agencies, levels of government, and/or the public, private and civic spheres in order to carry out a public purpose that could not otherwise be accomplished.” This definition highlights that collaborative governance broadly encompasses the processes and structures that engage people from multiple organisations and/or institutions. Similarly, in Huxham (2000), collaborative governance is used to refer to “all forms

of, and labels for, governance that involves people in working relationships with those in other organisations”.

Ansell and Gash (2007: 544) have a more specific definition, defining collaborative governance as:

“a governing arrangement where one or more public agencies directly engage non-state stakeholders in a collective decision-making process that is formal, consensus-oriented, and deliberative and that aims to make or implement public policy or manage public programs or assets”.

This definition highlights that the collaboration is organised and initiated by a public agency or institution; that non-state stakeholders are included in the collaboration process; that all participants involved in the collaboration engage directly in collaboration processes and decisions and are not just “consulted” by public agencies or institutions; that the group collaborating formally meet regularly and that the decisions made are clear and agreed upon by all those involved (Ansell & Gash, 2007: 545). While it is evident that the concept of collaborative governance has momentum and a wider meaning over time, for the purpose of this study, the definition of collaborative governance provided by Ansell and Gash (2007) will be used.

Collaborative governance is increasingly being recognized in literature and practice for its usefulness for addressing complex problems, such as climate change, (Ansell & Gash, 2007; Baird, Plummer & Bodin; Bingham, O’Leary, & Carlson, 2008; Barton et al., 2015; Mayer & Kenter, 2015). For example, Booher (2004) showcases how the Sacramento Water Forum in California was a collaborative effort that emerged in order to address controversial public policy issues. Additionally, Barton et al. (2015) use the collaborative development of a Regional Climate Adaptation Plan for Santiago de Chile as a case study to showcase that a collaborative governance process can be an effective form of generating a coordinated response to climate change

2.1.1. Benefits of collaborative governance

A more collaborative governance approach to decision-making and practices has been found to have a variety of benefits if carried out correctly. Given that collaborative engagements can include a diverse array of knowledge and information about what services are needed and the problems and the concerns that need to be addressed, there is a greater possibility of this resulting in higher quality decisions being made (Beder, 2006: 120; Reed, 2008: 2420). Therefore, collaborative engagements may also increase the value and integrity of information on the topic under discussion by providing higher quality sources of information (Reed, 2008: 2420). Moreover, when successful, a collaborative governance approach

can, among other things, result in capacity for joint action, more accountability, ownership, increased engagement with civil society, effective and consistent on the ground implementation as well as higher levels of success (Emerson et al., 2011; Johnston et al., 2010; Reed, 2008). For example, Broto et al. (2016), highlight that taking collaborative approaches to urban planning can allow for multiple people's concerns to be heard and acted upon.

2.1.2. Drivers of collaboration

Beyond the potential benefits found to accompany collaborative governance, there are numerous factors that have been found to drive people, organisations or institutions to collaborate. One factor seen to drive collaboration is what Emerson et al. (2011: 9) refer to as “consequential incentives”. Consequential incentives can consist of problems, situational or institutional crises, threats, resource needs, interests or opportunities that can be overcome more effectively together with others than alone (Bryson et al., 2016; Emerson et al., 2011). According to Ansell and Gash (2008), incentives driving people to participate in a collaboration partly depend on their expectations about whether the collaborative processes will result in meaningful outcomes, especially given the amount of time and energy that collaboration requires. For example, stakeholders' incentives to participate in collaborations are said to increase when they see a direct relationship between their participation and concrete, tangible, effective outcomes and where collaborations may have the potential for sharing and leveraging scarce resources (Ansell & Gash 2008; Emerson et al. 2011).

Another driver of collaboration is when people, organisation or institutions are unable to accomplish or overcome a challenge on their own (Bryson et al., 2016; Emerson et al., 2011). According to Emerson et al. (2011: 9) this is the ultimate consequential incentive driving collaboration. Closely linked to this is the role that uncertainty plays in driving collaboration. Uncertainty about how to solve problems alone can increase an individual's motivation to collaborate in order to mitigate, reduce and/or share risks (Emerson et al. 2011: 11-12).

Moreover, the presence of a leader is often seen to be an essential driver of collaboration. A leader is found to drive a collaboration if they are in a position to initiate and help secure resources and support for a collaborative engagement; are committed to collaboratively solving a problem; are willing not to push the adoption of a particular solution and if they have respect for other stakeholders involved in the collaboration (Emerson, 2011: 9).

Various other factors have been found to drive collaboration, including the introduction of new government legislation, policies or regulations; a culture of risk-taking, which encourages experimentation; and the provision of ring-fenced funding to support the implementation of

collaborative ventures, or even just covering the costs of hosting meetings (see Emerson et al., 2011; Porter & Birdi, 2018).

While there are various drivers of collaboration as described above, it is worth noting the possible constraints to starting collaborations which can arise from individuals not feeling the need to involve others. For example, if they feel little incentive or reason to change the status-quo, if there is an aversion to taking risks, or if there is insufficient or no financial resources they may be less likely to join a collaborative venture (Porter & Birdi, 2018).

2.1.3. Conditions for successful collaboration

There are various elements or conditions that are found to enhance the likelihood of successful collaboration, which are outlined in Table 1. The first and most obvious element is including diverse stakeholders in the collaboration (Mayer & Kenter, 2015). As stated by Ansell and Gash (2012: 556) collaboration “must be broadly inclusive of all stakeholders who are affected by or care about the issue”. As previously discussed, including a diverse group of stakeholders in a collaboration bring a variety of perceptions, knowledge and resources together (Mayer & Kenter, 2015: 51). Importantly, Connelly, Zhang and Faerman (2008: 22) highlight that both the number and the variety of people involved in a collaboration can impact, amongst others, the group dynamics and the ability to reach agreements within the collaboration. Furthermore, decisions in a collaboration are more readily met when there is a relatively small number of people, organisation and/ or institutions involved (Connelly et al., 2008: 27).

Closely aligned to this is the importance of selected stakeholders’ commitment to the collaboration. Stakeholders’ level of commitment to a collaboration is an essential component in determining whether a collaboration is successful or not (Alexander, Comfort, and Weiner 1998; Gunton and Day 2003; Margerum 2001; Tett, Crowther, and O’Hara 2003 in Ansell & Gash, 2012: 559).

Beyond stakeholders’ commitment, ensuring at the start of the process that there is a shared understanding, vision and goals amongst the stakeholders is another essential ingredient to ensuring successful collaboration. According to Connelly et al. (2008: 21) collaboration involves individuals, organisation and/or institutions working simultaneously to meet their own needs and the needs of others involved. In light of this, the need for stakeholders to develop a shared understanding and vision of what they can collectively achieve together forms a vital aspect of collaboration and ensuring its success (Ansell & Gash, 2012: 560; Bryson, Ackermann & Eden, 2016; Mayer & Kenter, 2015: 52). A large part of this is establishing and setting attainable, clearly articulated and agreed upon goals,

which forms the basic foundation of ensuring successful collaboration (Conley & Moote, 2003 in Mayner & Kenter, 2015: 52).

Gaja and Koliba (2007) contend that the first link that often bring stakeholders together is common interest, allowing a bond to form and facilitating a sense of group ownership of an issue. At this point dialogue and effective communication is essential in transforming a common interest into a shared vision. Communication has been found to be a vital component of collaboration (Mayer & Kenter, 2015). Open and frequent lines of communication are effective in attaining shared understanding, vision and goals amongst stakeholders, as well as promoting healthy dialogue, information sharing, knowledge generation and increased social capital (Mayer & Kenter, 2015: 49). According to Ferreyra and Beard (2007, in Mayer & Kenter, 2015) collaborations with poor communication amongst stakeholders can have various inter- and intra-organisational challenges that can affect the collaboration and the relationships of the stakeholders within it.

Furthermore, throughout literature, consensus decision-making is seen as both a necessary and vital component of group decision-making in collaborations (Mayer & Kenter, 2015). However, reaching consensus among diverse group stakeholders and interests is not always a simple or straightforward task (Barton et al., 2015).

Leadership, which was previously noted to be a driver of collaborations, is also found to be another important aspect of ensuring successful collaboration throughout literature (Connelly et al., 2008: 28; Emerson et al., 2011; Mayer & Kenter, 2015: 52). According to Bryson et al. (2006, in Mayer & Kenter, 2015: 53), “in collaboration, leadership is much more likely to be shared and transferred, as well as both formal and informal relations”. In addition, Mayer and Kenter (2015) note that effective leadership often requires a strong convener or an individual that is responsible for initiating the collaboration and undertaking the tasks required to kick start the process such as bringing in stakeholders, goal-setting and guiding the process through any challenges the group may face (Bryson et al., 2006; Gray, 1989). The presence of strong leadership and an effective convener, according to Ansell and Gash (2007: 550), can add legitimacy and credibility, while also providing “essential mediation and facilitation for the collaborative process”.

Trust is another factor that is considered to be invaluable in enabling successful collaboration (Ansell & Gash 2008; Emerson et al., 2011; Porter & Birdi, 2018). High levels of trust between stakeholders can lead to mutual understanding, legitimacy and commitment among stakeholders (Emerson et al., 2011). In this regard, given that trust takes time to develop, regular face-to-face interactions are encouraged. Trust-building is a time-consuming process that requires a long-term commitment to

achieving collaborative outcomes. Therefore, Ansell and Gash (2008), suggest that if there is a history of high conflict between stakeholders, the collaboration should budget realistic time and resources for remedial trust-building. If the necessary time and cost cannot be justified, then collaboration should not be attempted. Trust can be built by sharing information and knowledge, demonstrating competency, good intentions, and follow through (Bryson et al., 2006).

In addition, when understanding collaborations, in order to enhance the effectiveness of the process there needs to be a sensitivity to any power imbalances between stakeholders (Ansell & Gash, 2008; Porter & Birdi, 2018). This sensitivity requires first the awareness that some stakeholders may have more or less influence in the collaboration process, and second having effective means for preventing the more powerful actors from overly exerting their influence. The full acceptance of different values, norms and cultures, which would seem related to power imbalances is vital. Porter and Birdi (2018), offer the example of indigenous or local knowledge often being de-valued by westernised, “scientific” systems of knowledge production, even though local communities are generally very close and connected to the problems at hand. This goes hand-in-hand with the recognition that local stakeholders possess localised and contextual knowledge that is important to the process of collaboration.

Table 1: Key conditions for successful collaboration

Condition	References
Inclusion of diverse stakeholders	Ansell et al. (2020); Ansell & Gash (2012); Connelly et al. (2008); Mayer & Kenter (2015); Reed (2008)
High level of commitment from stakeholder to the collaboration process	Alexander, Comfort, & Weiner 1998; Gunton & Day 2003; Margerum 2001; Tett, Crowther, & O’Hara 2003 in Ansell & Gash, (2012: 559); Emerson et al. (2011)
Shared understanding, vision & goals amongst the stakeholders	Ansell et al. (2020); Ansell & Gash (2012); Bryson et al. (2016); Connelly et al. (2008); Mayer & Kenter (2015)
Establishing & setting attainable, clearly articulated and agreed upon goals	Conley & Moote (2003) in Mayner & Kenter (2015: 52)
Dialogue & effective communication	Mayer & Kenter (2015)
Consensus decision-making	Barton et al. (2015); Mayer & Kenter (2015)
Effective leadership	Ansell et al. (2020); Connelly et al. (2008); Doberstein (2016); Emerson et al. (2011);

	Mayer & Kenter (2015); Page (2010)
High levels of trust between stakeholders	Ansell et al. (2020); Ansell & Gash (2008); Emerson et al. (2011); Porter & Birdi (2018)
Sensitivity to & awareness of any power imbalances between stakeholders	Ansell & Gash (2008); Porter & Birdi (2018)

It is important to keep in mind the external system context within which the collaboration is occurring in. Emerson et al. (2011: 8) state that the external system context, which includes things like elections, economic down turn etc., can also influence the dynamics and performance of a collaboration by creating opportunities or constraints for the collaboration. Emerson et al. (2011: 8) highlight a number of external contexts that can enable or hinder the success of a collaboration. These are depicted in Table 2.

Table 2: Aspects of external/ general system context that can influence collaborative engagement (adapted from Emerson et al., 2011: 8)

Key aspects of external system	
1	Resource conditions in need of improving, increasing or limiting
2	Political and legal frameworks
3	Prior failure to address issues through conventional channels and authorities
4	Political and power dynamics
5	Level of trust / conflict
6	Socio economic/ cultural health and diversity
7	Level of connectedness within and across networks

2.1.4 Challenges associated with collaboration

While literature highlights the potential benefits of collaborative engagements, it is worth noting the growing recognition of the possible challenges associated with collaboration (Bryson et al., 2016: 2; Vangen & Huxham, 2013; Connelly et al., 2008). Connelly et al. (2008: 7) hold that the simultaneous attention in literature to both the benefits and challenges of collaboration suggests a paradox – that collaborations are both appealing (due to the potential benefits) and unappealing (due to the potential challenges) to organisation or institutions wanting to collaborate. However, Connelly et al. (2008: 17), argue that such paradoxes are unavoidable and that organisation or institutions should embrace these paradoxes.

There are various tools and mechanisms that can be adopted and used to facilitate collaboration amongst diverse stakeholder interests and perceptions in order to stimulate innovation, especially when

it comes to urban planning decisions and practices. One tool that aids in facilitating collaboration, especially in relation to urban planning processes and practices, is participatory or collaborative mapping (see Figure 1).



Figure 1: Diagram showing the relationship between collaborative mapping and collaborative governance

2.1.5 The value of collaborative mapping towards collaborative governance

According to Borie et al. (2019a) maps can be used to facilitate collaboration amongst a group of diverse people and as emerging visual tools for analysing and understanding the city. The former is echoed by MacEachren (2000: 445), who highlights that there is increasing acknowledgement of mapping processes inherent ability to facilitate collaboration in a range of disciplines and sectors including resource management, education and urban planning. For example, Harvey and Chrisman (1998) highlight how maps, as visual representations and products, can be used to facilitate collaboration between different actors and disciplines (Harvey & Chrisman, 1998). Additionally, Borie et al. (2019: 3b) explore how maps and mapping offer opportunities for resilience through connecting diverse actors, scales and forms of knowledge.

Interestingly, Black and Anderson (2012: 200) hold that maps, or the process of mapping, can facilitate collaboration when the maps function as boundary objects. A boundary object, a construct from sociology, is a tangible object ‘adaptable’ enough to be interpreted differently by people whose expertise differed without losing a coherent identity across the social worlds it is spanning (Star & Griesemer, 1989). Black and Anderson (2012: 200) highlight that visual products serve as boundary object when they have the following characteristics: (1) when they are tangible, two-dimensional or three-dimensional shared representations; and (2) when they portray noticeable dependencies and relationships among participants’ objectives, expertise, actions and decisions. Star and Griesemer (1989: 412) suggest that boundary objects are useful because they aid in negotiations and can advance shared understanding when participants can transform the representation to show their understanding and perspectives more clearly (Carlile, 2002). Therefore, collaboratively produced maps can share visual representations that showcase various participants perceptions on complex topics, such as the location of valuable natural assets in a city.

In addition to being mediators of collaboration amongst people, maps can be utilised as visual tools for analysing, understanding and rethinking a city (Dovey & Ristic, 2015; Drakou et al., 2015). Given that urban planning is considered to be a practice in which visualization plays a critical part, the potential value of maps in this regard is evident (Söderström, 1996: 250). Furthermore, Dovey and Ristic (2015:12) highlight that mapping involves a production of knowledge about how a city works and thus plays a critical role as a “knowledge base” for adaptation and transformation of cities to a more sustainable, climate resilient path. One of most beneficial aspects of a map stems from its overlaps and intersections with planning and designing. A map is generally seen to display an existing city while planning and designing engage with the potential and possibilities of the future city (Dovey & Ristic, 2015: 13).

The data presented in maps can be derived in various ways, including remote sensing data interpretation, traditional field survey methods, modeling and interpolation as well as participatory mapping (Drakou, et al., 2015: 134). Geographically, for example, Brown, Montag and Lyon (2012), evaluate the use of Public Participatory Graphic Information Systems (PPGIS) as a methodology to identify and spatially locate ecosystem services in Grand County, Colorado. GIS are digital tools designed to “harvest, manipulate and display” spatial information (Tomlinson 2013 in Dovey & Ristic, 2015: 1). The concept of PPGIS describes the process of using GIS technology to capture local knowledge with the goal of including and empowering marginalised groups, and therefore is a form of collaborative mapping. In addition to this, it can be argued that, the more people there are involved in the mapping process, the more valuable the “knowledge base” of the maps will be.

Historically, maps have been highly critiqued for firstly, being socially constructed representations of geographical spaces (Pickles, 1999) and secondly, for the authority conveyed by maps as scientific objects (Pavlovskaya, 2009). Collaborative or participatory mapping approaches tries to address some of these issues by including a diverse number of stakeholders into the process (Taylor et al., 2020: 2).

Including diverse stakeholders in the mapping development process has various additional benefits. Firstly, collaboratively mapping features under discussion allows information and knowledge from a wide range of perspectives and disciplines to be integrated (Brown et al., 2012). For example, Brown et al. (2012), found that that PPGIS, as a collaborative methodology for developing maps, shows potential for identifying ecosystem services to augment expert judgement and to inform policy and management decisions. Additionally, the inclusion of diverse knowledge can enhance the understanding and the decision-making processes of the topic, especially complex topics (Black & Anderson, 2012; MacEachren, 2000). Brown and Weber (2011), evaluated the use of a PPGIS methodology for national park planning, and found that PPGIS expands a park agency’s planning process and decisions. Black and Anderson (2012) note that boundary objects, like maps, can be effective tools for conflict resolution and problem solving.

Collaborative mapping methods can range from paper-based applications, where participants identify attributes and locations on paper using stickers or markers, to more advanced digital computer-based applications, where participants identify locations using digital tagging or drawing (Brown, 2012; Brown et al., 2012). Alternatively, some studies take on a methodology which contains elements of both, in what they call qualitative GIS mapping methods. Taylor et al. (2020), showcase the benefits of qualitative GIS mapping approaches and their potential to go beyond traditional GIS approaches and integrate local stakeholders experience into existing infrastructures for urban planning. According

to Taylor et al. (2020: 9) by incorporating qualitative narratives into grid maps, “richer contextual detail is added to the maps”. For example, they found that city officials’ in the City of Cape Town, South Africa, wanted to be able to contribute to the maps they were generating so that the resulting maps could be representative of both the city officials and the community members perceptions of the geographical information under discussion. In addition, they hold that adopting a qualitative GIS mapping method, enhance the outcoming maps ability to be inclusive and holistic (Taylor et al., 2020: 9). This research will focus on qualitative mapping given that the method utilised during the collaborative mapping of urban natural assets in Lilongwe City aligns closely to it.

While there are various benefits, there are also a few shortfalls associated with collaborative mapping processes. For instance, the information represented by the various participants can be influenced by their knowledge on the subject. For example, in Brown et al.’s (2012) study on the collaborative identification and mapping of ecosystem services, they found that the individuals most likely to identify services are highly educated, knowledgeable about nature and science, and have more of a connection to the outdoors. This means only selected information or knowledge may be represented in the map. In addition, collaborative mapping can be a time-consuming process. However, up-front investment in effective collaboration can sometimes save considerable time and energy in downstream implementation. Once stakeholders achieve a working consensus, the literature suggests that implementation can occur quite rapidly. Thus, policy makers might be more favourable to collaboration where they expect a difficult implementation process (Ansell & Gash, 2007: 563).

2.2. Study context: collaborative mapping of urban natural assets in Lilongwe

The study was conducted in the city of Lilongwe, which is both the capital of and one of the fastest growing cities in Malawi (Hoff, 2020). The city, named after the Lilongwe River that passes through it, is commonly known as a “Garden City” due to its vast open green spaces which house a wide range of species (City of Lilongwe, 2013). There are healthy populations of carnivores, primates, antelope, bats and birds, all living right under the noses of the residents in Lilongwe (CRA, 2017). However, due to the rapid urban expansion taking place within the city, the green spaces and the general status of biodiversity are under major threat. For example, new developments have been built on river buffer zones, protected parkland has been bought for private developments and new housing plans have been made with no provision for green or public spaces (IIED, 2016). In the 2013 Biodiversity Report of Lilongwe, Executive officer of Lilongwe City Council at the time stated that, “The City of Lilongwe needs to be an inclusive city in which all its people should have access to basic services and proactive in meeting development changes as well as having the foresight to plan ahead to mitigate new challenges” (Local Action for Biodiversity, 2013).

Through ICLEI Africa’s Urban Natural Assets: Rivers for Life (UNA Rivers) project, land-use planners and environmental officers from Malawi’s Lilongwe City Council and Malawi’s Department of Environmental Affairs were brought together in 2017 to discuss how to better embed natural asset considerations in city planning processes. This was a significant development in itself as cross-departmental collaborative meetings aimed at linking planners and environmentalists had never been held previously. Through these meetings urban planners and environmental officers identified the need to better incorporate natural assets in Lilongwe City’s planning processes. It was decided that an urban natural assets map needed to be collaboratively developed in order to firstly, identify and delineate key natural assets in and around the city of Lilongwe, and secondly, assign priority status for to each natural asset.

Over a 12-month period, city planners and environmental officers collaborated to create the natural asset map, using input from researchers whenever necessary. For instance, collaborative mapping together with sightings and questionnaire surveys across the city, and species-specific tracking data were done within Lilongwe city boundary to identify the location of urban natural asset biodiversity hotspots (ICLEI CBC: 2019; CRA, 2017: 26). Urban natural asset values on a scale from 1 (low) to 4 (priority) were assigned to areas based on a combination of a) expert opinion of the biodiversity value of habitat/land use categories and b) biodiversity records obtained through surveys (CRA, 2017: 27). The locations of the urban natural asset hotspot areas in Lilongwe are depicted in Figure 2.

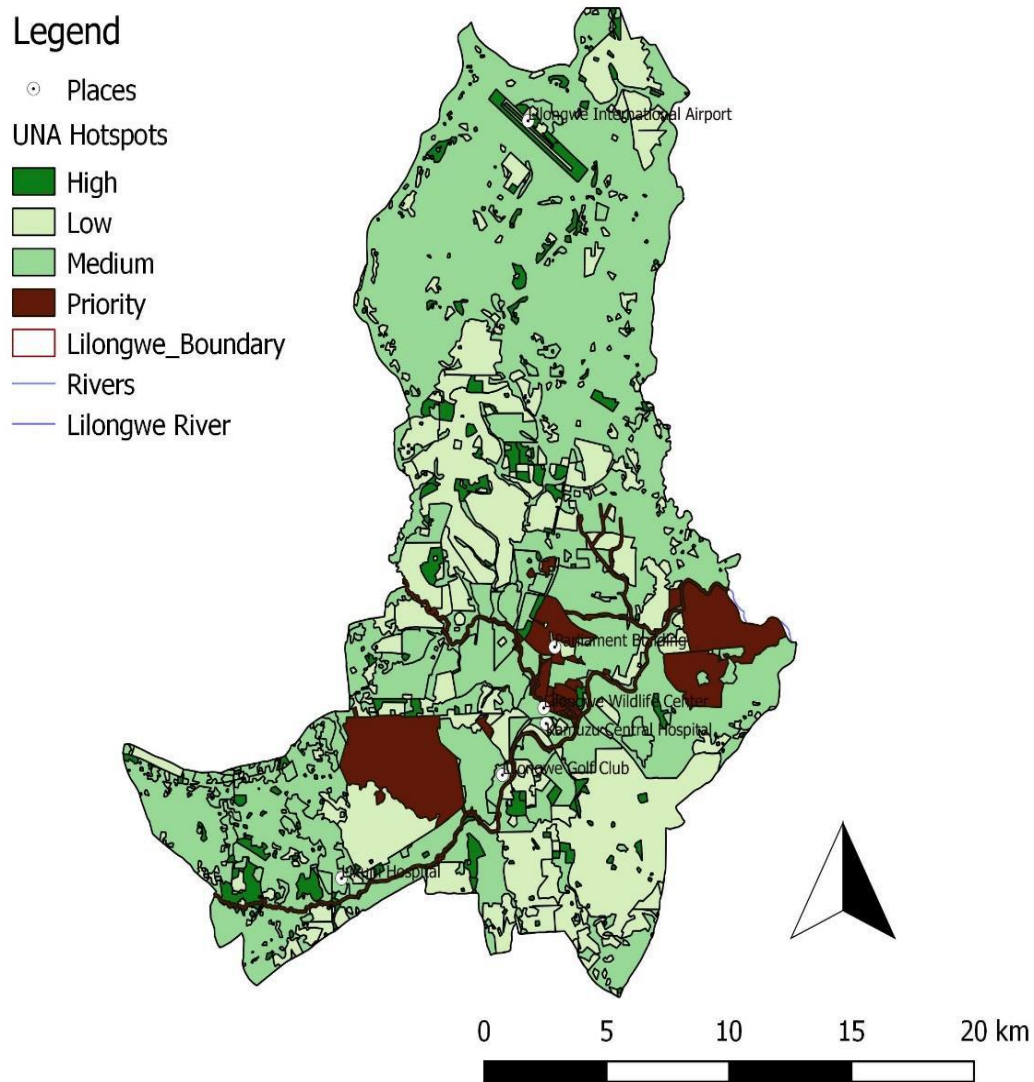


Figure 2: Map showing the location of the urban natural asset hotspots in Lilongwe, Malawi.

Chapter 3: Research Methodology

3.1. Introduction

This study is based on a case study of collaborative mapping in Lilongwe city in Malawi (see 2.2). A case study encompasses an in-depth investigation of a single individual, group, place or event. Case studies may be descriptive or explanatory. A case study cannot be generalised

I used a qualitative approach to collect and analyse data. The study included three primary methods: 1) analysis of existing documents relating to the collaborative mapping process, 2) in-depth, semi-structured interviews with participants involved in the collaborative mapping of urban natural assets in Lilongwe, and 3) a focus group discussion with the UNA Rivers project team members from ICLEI Africa. This chapter provides a detailed description of these methods as well as the limitations and constraints of both the methods and the study. Ethical considerations have also been included.

3.2. Participant selection

Targeted sampling was used in order to select the research participants for both the semi-structured interviews and the focus group discussion. Targeted sampling is a sampling technique that involves strategies to ensure that individuals with the specific relevant characteristics within a given geographical area have a high chance of appearing in the research sample (Monette et al., 2005, in Strydom, 2011: 222). For the semi-structured interviews, target sampling was carried out by using the attendance registers and contact list (held by the UNA Programme manager at ICLEI Africa) highlighting the 10 individuals that were involved in the initial collaborative urban-natural asset mapping process in Lilongwe. Four of the individuals were female, and six were male. Of these 10 people involved in the collaboration, nine people were contacted via email to set up interviews. The 10th person has since then resigned from the Lilongwe City Council and could not be reached. Of the nine individuals contacted, eight responded and agreed to have interviews. Further details on the interviews are provided below.

After analysing the semi-structured interview findings, a focus group discussion for reflection on the findings was carried out with five ICLEI Africa staff members who all work on the UNA rivers project. Targeted sampling was also carried out for selecting these five participants with the help of the UNA rivers project manager.

3.3. Data collection

Data collection began by drawing from existing documents from the collaborative mapping process undertaken in Lilongwe three years ago by ICLEI Africa. Such documents included trip reports and

notes. This analysis provided a general sense of the collaborative mapping process, who was involved in the process, how it was undertaken and how long it lasted. Following this, semi-structured interviews were arranged and carried out with eight individuals to gain more insight into the mapping process and outcomes. Even though interviews are not without limitations they are useful in obtaining large amounts of data, especially in-depth data, quickly (Greef, 360: 2011). These interviews had to be done via Skype due to the COVID-19 international travel restrictions. The actors included individuals from Lilongwe City Council, Malawi’s Environmental Affairs Department, ICLEI Africa’s UNA: Rivers project team as well as non-state actors from Conservation Research Africa (CRA) in Lilongwe (Table 3). Actors from these institutions were selected as they were involved in the collaborative mapping process.

Table 3: List of interviewees’

Interviewee’s assigned number	Institution/organisation
Participant 1	Lilongwe City Council (Department of Planning and Development)
Participant 2	Lilongwe City Council (Department of Planning and Development)
Participant 3	Lilongwe City Council (Department of Parks, Recreation and Environment Affairs Directorate)
Participant 4	Lilongwe City Council (Department of City Development Strategy)
Participant 5	Government of Malawi (Malawi Environmental Affairs Department)
Participant 6	Conservation Research Africa
Participant 7	ICLEI Africa
Participant 8	Lilongwe City Council (Department of Planning and Development)

The semi-structured interviews were organised around particular areas of interest while still allowing flexibility to explore and expand on interesting points that emerged in the interviews (Greef, 2011: 351-352). These areas of interest included questions around the individual’s roles in the participatory mapping process, their experiences of the collaborative mapping process as well as their individual perceptions of the usefulness of collaborative mapping process were asked and captured (objective b). For objective c, respondents were asked questions around the use of the maps produced and the extent to which the various actors have collaborated since the production of these maps. Table 4 provides examples of the types of questions asked during the interviews.

Informed consent was sought before the virtual interviews were carried out and participants were assured of confidentiality at the outset (see consent forms in the Appendices). An interview guide with a predetermined set of questions was used to guide all the interviews with the selected participants (see Appendices section 8.1). During the interviews, which were carried out in English, full and accurate notes were taken to remember and explore the participants answers. If permission was granted by the interviewee, the interviews were voice recorded using a cell phone allowing for more substantive engagement and record of the interview (Greef, 2011: 359).

Following the analysis of the semi-structured interviews, the focus group discussion was set up with the UNA Rivers project team. All five team members were invited and attended the focus group discussion which took place virtually over Skype. During the focus group the UNA Rivers project team members were presented with selected findings from the semi-structured interviews. More specifically, the focus group included me presenting perceptions of interviewees’ on how collaborative mapping processes can be made more effective (i.e. Table 7) as well as interview participants perceptions on why the urban natural asset hotspots map is not being used to inform city planning and developing decisions in Lilongwe (i.e. Table 9). The UNA Rivers project team members where then requested to reflect on these results and provide further inputs based on their personal experiences and perceptions as members of the UNA Rivers team (See guide for focus group discussion in Appendices section 8.3).

Table 4: Examples of questions asked during semi-structured interviews

Focus of interview questions	Examples of questions
Work and organisational role	<ul style="list-style-type: none"> • What is your work description and responsibility? • How long have you been working here?
About the 2017 urban asset mapping process including why and how the mapping activity was started	<ul style="list-style-type: none"> • Can you tell me about the 2017 urban asset mapping process you were involved in, including why and how the mapping activity was started? • Why do you think you were invited to the meeting?
Goals of the urban natural asset mapping activity	<ul style="list-style-type: none"> • What do you understand were the goals of the collaborative mapping process?
Institutions/individuals involved in the urban natural asset mapping activity, and whether they were ‘best placed’ to be involved	<ul style="list-style-type: none"> • Why did you join this collaboration? <ul style="list-style-type: none"> i) What were you able to bring to the collaborative process? What was your role during the collaboration? ii) What were you hoping to get out of it? • What other sectors and organisations were there and why do you think they were included? • Were there any important sectors or organisations that were not represented at this activity that would help it achieve its intended goals? Why do you think they were not included?
Expectations of the urban natural asset mapping activity	<ul style="list-style-type: none"> • What were your expectations of the mapping process? • Do you think these expectations were fulfilled? Why?
Attendance and inputs during the collaborative urban natural asset mapping process	<ul style="list-style-type: none"> • How many of the engagements/ workshops where you able to attend?

	<ul style="list-style-type: none"> • Did you have any guidance, before or at the beginning of the workshop, prior to the mapping activity? <ul style="list-style-type: none"> i) If so, in what way were you guided? • Were you able to provide input and share your perspective during the mapping activity? <ul style="list-style-type: none"> i.) If so, what was your contribution and how were you enabled to share? ii) If not? why?
What did and did not work well for during the urban natural asset mapping process	<ul style="list-style-type: none"> • What do you think worked well during the mapping process? • What do you think could have been done differently (if at all) to: <ul style="list-style-type: none"> i) Improve the process? ii) Ensure continued collaboration?
Learnings from the urban natural asset mapping collaboration	<ul style="list-style-type: none"> • What did you learn from the collaborative process? <ul style="list-style-type: none"> i) Have you been able to apply any of this learning? - if so, what and how was this enabled? ii) What did you share with your colleagues back at the office?
Use of the urban natural asset maps	<ul style="list-style-type: none"> • Have you or your work colleagues used the collaboratively produced urban natural asset maps to inform urban planning or other activities? <ul style="list-style-type: none"> i) If so, how? ii) If not, why? • Do you know if the collaboratively produced urban natural asset maps have been used by others in Lilongwe? <ul style="list-style-type: none"> i) If so, do you know by who and how? ii) If not, do you know why that may be?
Collaboration since the production the urban natural asset maps	<ul style="list-style-type: none"> • Have you been in contact with the participants since the collaborative process? <ul style="list-style-type: none"> i) If so, why & who? ii) If not, why not? • Do you think the collaboratively produced urban natural asset maps has enabled further collaboration between key stakeholders in Lilongwe City? <ul style="list-style-type: none"> i) If so, how? ii) If not, why?

3.4. Data analysis

All voice recordings of the interviews were transcribed in separate Microsoft Word documents. While this is a time-consuming process, the written transcription allowed me to go through the interviews in depth, allowing me to make comments and linkages where necessary. In addition, it allowed me to capture information more accurately, especially if I wanted to quote interview participants. The Word documents were then printed for coding by hand, which was a suitable approach given the small sample group of this study. Different coloured highlighters and pens were used to code, categorise and organise topics and themes in the transcriptions of the interviews. Examples of these themes, included: participants perceptions on the usefulness of the collaborative mapping process, possible conditions for collaboration (illustrated in Table 1) that may have been present and in turn enhance the usefulness of the collaboration, participants opinions on the value of the maps developed, and to what extent the hotspot map has been used to inform city planning decisions.

After the focus group discussion with the UNA Rivers team members, the Skype recording was also transcribed into a Microsoft Word document. Once the transcription was completed the Word document was printed for analysis as described above.

3.5. Ethical considerations

I read and understood the University of Cape Town Code of Ethics (2020) and I made sure to adhere to the guidelines given. The ethical clearance for this research was obtained from the Faculty of Science Research Ethics Committee at University of Cape Town, with the approval code: FSREC 019 – 2020. In addition, through ICLEI Africa, permission was granted to undertake research in Lilongwe, Malawi (see appendix 8.5).

Furthermore, at the start of each interview as well as the focus group discussion, all participants were sent a study participation consent form which provided them with a brief overview of the study as well as the measures taken to secure ethical compliance prior to collecting data, and alert them to their rights as research participants, this included their right not to participate or not to answer ; their ability to withdraw from the interview or study at any point; confidentiality of the information shared during interviews and lastly, anonymity of their identities. This study, refers to interview participants by using numerical values for example, participant 1, participant 2, participant 3, etc. In addition, focus group participants are assigned numeric values, for example, UNA team member 1, UNA team member 2, UNA team member 3 etc. UNA team member 5 is also Participant 7 as this individual was interviewed and also formed part of the focus group.

3.6. Limitations of the research

This study was not without limitations. In fact, the study was undertaken bearing such a possibility in mind. The study faced two challenges namely COVID-19 pandemic and the presidential elections. Due to the travel restrictions associated with the COVID-19 pandemic it meant there was an inability to travel to Lilongwe for in-person interviews. Similarly, due to the COVID-19 restriction put in place, the focus group discussion with the UNA Rivers project team also had to occur over a virtual Skype set up instead of being in-person. Given that in-person interviews were not possible and the associated impacts of COVID-19 on people's work and daily lives, it meant that getting on touch with participants was extremely challenging. This was particularly true for the participants based in Malawi, where many often do not have easy access to internet data or the correct software for interviews. This meant that I had to probe and follow up with interviewee's multiple times to set up interviews and discuss the most suitable platform available to them for the interview. In addition to this, the limited communication with interview participants in Malawi, especially those working in government

departments, was exacerbated by the occurrence of Malawi's Presidential Election in the 23rd of June 2020, which resulted in reduced communication with city officials.

Chapter 4: Understanding the collaborative mapping process of urban natural assets in Lilongwe

4.1. Introduction

This chapter provides the results related to objective a) the steps and processes employed in a collaborative mapping process related to urban natural assets in Lilongwe. It describes the steps undertaken in order to develop and implement the urban natural asset hotspots map for Lilongwe. More specifically, section 4.2. highlights how the collaborative mapping group emerged. Section 4.3. describes the results pertaining to the steps undertaken to develop and implement the urban natural asset hotspots map for Lilongwe. This is followed by a discussion section (Section 4.4.), which unpacks these findings in relation to the trends found in academic literature.

4.2. Emergence of the collaborative mapping team

Through ICLEI Africa's UNA Rivers project, ICLEI staff members flew to Malawi towards the end of 2016 early 2017 in order to discuss the needs of Lilongwe City in relation the project aims (Participant 7). The UNA Rivers project includes five overarching aims, which are as follows (ICLEI CBC, 2020):

1. Mainstream biodiversity and nature-based solutions into land use planning and decision-making processes
2. Increase awareness of ecosystem services through capacity building
3. Mobilise project activities through alignment with international policies and processes (such as the Convention on Biological Diversity's Aichi Biodiversity Targets and the Sustainable Development Goals)
4. Improve co-ordination between key stakeholders to work together towards integrating biodiversity into land use planning
5. Connect local communities with nature to encourage appreciation, cultural activation and enhance human well-being
6. Implement community-based projects along urban river systems to improve river restoration and revitalization, and improve human well-being and livelihood creation.

During the "needs assessment" discussion that ICLEI Africa staff had with roughly 25 state and non-state actors (Participant 7), the need for an urban natural asset hotspots map showcasing not only where key natural assets are located within and around the City of Lilongwe, but also the priority status of those natural assets, arose very strongly. It was believed that an urban natural asset hotspots map would be as a valuable tool to guide city planning and development decision-making processes in Lilongwe

in a way that protects and conserves valuable natural assets housing important plant and animal species and benefiting people in and around the city (Participant 7; ICLEI CBC, 2019).

“In 2016, [ICLEI Africa] went to the Lilongwe City Council and... said to them [that they] have these 5 objectives underneath the UNA Programme, of which one is improving information – like basically capacity building. And the second one is around trying to link land-use planners and environmentalist better together to make more informed decisions around nature. We did a whole needs assessment where we met with about 25 different people to try and pull out like what are their needs and a strong [need] from the city council was, number 1, to learn where their natural assets are. And number 2, to try and do a prioritization exercise that showed how beneficial they are to their city and if they had to be lost how that would compromise the resilience of the city to be used as a decision-making tool so that land use planners could plan their cities better and environmentalists have that at their fingertips to use to make arguments to land use planners.” (Participant 7)

After agreeing on the need to locate urban natural assets, assign priority status to them and showcase them in the form of a hotspot map, a series of steps and processes were undertaken to make it happen.

4.3. Steps undertaken to develop and implement the urban natural asset hotspots map for Lilongwe

From the Conservation Research Africa (CRA) final report and participant interviews, it seems that there were, broadly speaking, six overarching steps employed in developing and implementing the urban natural asset hotspots map. The overarching steps are depicted in Figure 3 and discussed below.



Figure 3: Overarching steps undertaken to develop and implement the urban natural asset hotspots map for Lilongwe, Malawi.

4.3.1. Participant selection

Following the identification of the need for an urban natural asset map, the process of selecting individuals for the collaborative mapping team, hereafter referred to as the collaboration team, from certain institutions and organisations was carried out. Interviewee’s noted that the participation section was “very very targeted” (Participant 7). As a result, the collaborative mapping team comprised of 12

key stakeholders that related to the topic under discussion, of which nine stakeholders worked for the Lilongwe City Council (either in the Planning and Development Department or in the Parks, Recreation and Environmental Affairs Directorate), one stakeholder worked for Malawi's Environmental Affairs Department and one stakeholder worked for ICLEI Africa. However, due to the limited GIS capacity within the Lilongwe City Council (who only have one person working in the GIS department) (Participant 6), a consultant from Conservation Research Africa (CRA) in Lilongwe was brought on board to assist in collecting data on Lilongwe's natural assets and creating a baseline map. This map would later be discussed with the other collaboration team members. Through the UNA Rivers project, ICLEI Africa led with the hiring and payment of the consultant from CRA.

According to Participant 7, hiring a consultant *“was an issue ... a challenge”* as it meant the hiring process had to be done in accordance with ICLEI Africa's procurement procedures which are too bureaucratic and have certain selection requirements. Participant 7, elaborated on this by saying the following:

“because it's an ICLEI programme, we had to follow ICLEI's procurement processes, so what we did was we drafted out a terms of reference – we did give it to the City to comment and sign off on, but ultimately it was us who distributed that terms of reference” (Participant 7).

Given that ICLEI Africa had to follow their procurement processes in hiring the consultant it meant that the applicants had to meet certain criteria in order to be appointed rather than the City appointing a person. As a result, the consultant from CRA was selected as CRA met ICLEI Africa's procurement needs and ultimately approved the City of Lilongwe.

4.3.2. Urban natural asset data collection

After the participants were selected for the collaborative mapping process, including the appointment of CRA, CRA met with the entire collaboration team to discuss the urban natural asset mapping needs of the City to ensure everyone was on the same page.

Following the discussion, the first step was to identifying the location of urban natural assets in Lilongwe. CRA collected the relevant data using a combination of the following methods. Firstly, biodiversity surveys, which comprised of a bat surveys (see Figure 4) and a vegetation survey were undertaken. Secondly, carnivore and large mammal sightings were recorded opportunistically throughout the city during surveys (see Figure 5). Lastly, house to house surveys were conducted for 336 houses across four areas of Lilongwe City (CRA, 2017). Once the relevant data were collected and captured, the findings were projected in the form of GIS maps (CRA, 2017).

Legend

Bat captures (No. species)

- 0
- 1
- 2
- 3
- 4
- 5
- 6

— Roads2

— Rivers

▲ Places

— Lilongwe River

Habitat_Combined

- High Density Urban - Nonwooded
- Medium Density Urban - Nonwooded
- Low Density Urban - Nonwooded
- High Density Urban - Wooded
- Medium Density Urban - Wooded
- Low Density Urban - Wooded
- Medium-High Intensity Agriculture
- Low Intensity Agriculture
- Grassland/Scrub
- Parkland
- Shrubland
- Monoculture non-native woodland
- Mixed Non native woodland
- Mixed Miombo Woodland
- Riparian Woodland
- Open water

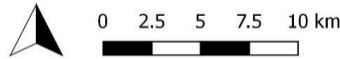
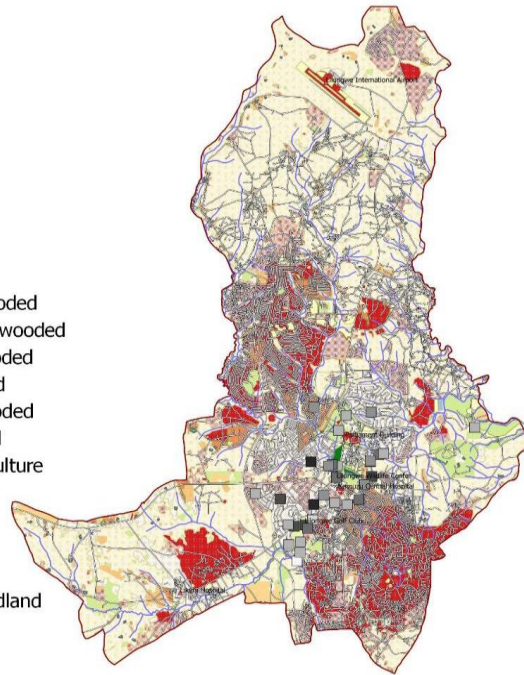


Figure 4: Map illustrating the number of bat species captured across sites in Lilongwe, Malawi (CRA, 2017)

Legend

Species

- Bdeogale crassicauda
- Genetta maculata
- Leptailurus serval
- Canis adustus
- Galerella sanguinea
- Genetta genetta
- Crocuta crocuta

— Rivers

Roads

— primary

Habitat Classes

- High Density Urban- Nonwooded
- High Density Urban- Wooded
- Medium Density Urban- Nonwooded
- Medium Density Urban- Wooded
- Low Density Urban- Nonwooded
- Low Density Urban- Wooded
- Low Intensity Agriculture
- Medium- High Intensity Agriculture
- Grassland/ Scrub
- Shrubland
- Monoculture Non-native Woodland
- Mixed Non-native Woodland
- Mixed Miombo Woodland
- Parkland
- Riparian Woodland
- Open Water

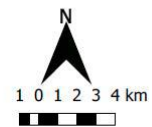
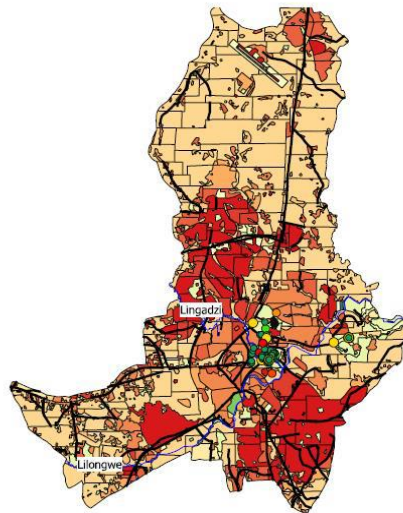


Figure 5: Map illustrating carnivore sightings in Lilongwe, Malawi (CRA, 2017)

The GIS maps were shown to the collaboration team, in order to ground truth the findings and to allow for any questions and suggestion to emerge and help guide the production on the final map. Participant 6, from CRA, noted that there were “*a lot of questions about bats*” from the collaboration team.

“Bats in Africa is always sort of controversial and they come with a lot of cultural beliefs etc. so there was a lot of interest around why we were using bats to indicate biodiversity and how that works and you know, the importance of that... so that was very good, so um, I thought that was very useful in giving the opportunity for them to ask specific questions about bats and why we are using bats and how bats can be effective to monitoring ecosystem quality”(Participant 6).

In addition, it was noted that they “*had a little discussion around key topics which [CRA] thought might be useful for them but there was obviously even a discussion from their [the government stakeholders] side*” (Participant 6).

While the limited inclusion of other stakeholders in this stage of the mapping process was noted as a shortcoming to the process (see section 5.3 in Chapter 5), house to house surveys were conducted by CRA in Lilongwe as part of the data collection process for the map, and having the selected individuals in collaboration team members did speed up the mapping process.

4.3.3. Mapping Lilongwe’s urban natural assets

Once the data collected were discussed and finalised, according to CRA (2017: 12), 17 pre-defined habitat/land use categories within the City of Lilongwe were digitised. This digitisation was done using the most recent Google satellite imagery at the time (March 2017) and the Open Layers plugin within QGIS version 2.16.3 (see Figure 6). QGIS is an open source GIS application (QGIS, 2020). During this process between March and June 2017, 1373 individual polygons were digitized by a human analyst from spatial data at scales between 1:7,000 and 1:10,000 using visual analysis (CRA, 2017: 12). The resulting polygons were corrected for overlapping and gap errors and then aggregated by similar class type. Data were partially ground-validated by the CRA field research team. Potential errors in the habitat/land use dataset include misclassification and incorrect spatial extent as are common in digitizing projects. This dataset is useful as a base map for understanding the spatial distribution and extent of various habitat/land use categories within Lilongwe” (CRA, 2017 :12).

While the process of mapping the natural assets in Lilongwe in GIS was not necessarily a collaborative process that included all stakeholders, the various maps created by CRA that contributed to the urban natural asset map were all presented to the collaboration group for further discussion, ground truthing and the way forward (see next section).

Legend

-  Lilongwe_Boundary
-  Rivers
-  Lilongwe River
- Habitat_Combined**
-  High Density Urban - Nonwooded
-  Medium Density Urban - Nonwooded
-  Low Density Urban - Nonwooded
-  High Density Urban - Wooded
-  Medium Density Urban - Wooded
-  Low Density Urban - Wooded
-  Medium-High Intensity Agriculture
-  Low Intensity Agriculture
-  Grassland/Scrub
-  Parkland
-  Shrubland
-  Monoculture non-native woodland
-  Mixed Non native woodland
-  Mixed Miombo Woodland
-  Riparian Woodland
-  Open water

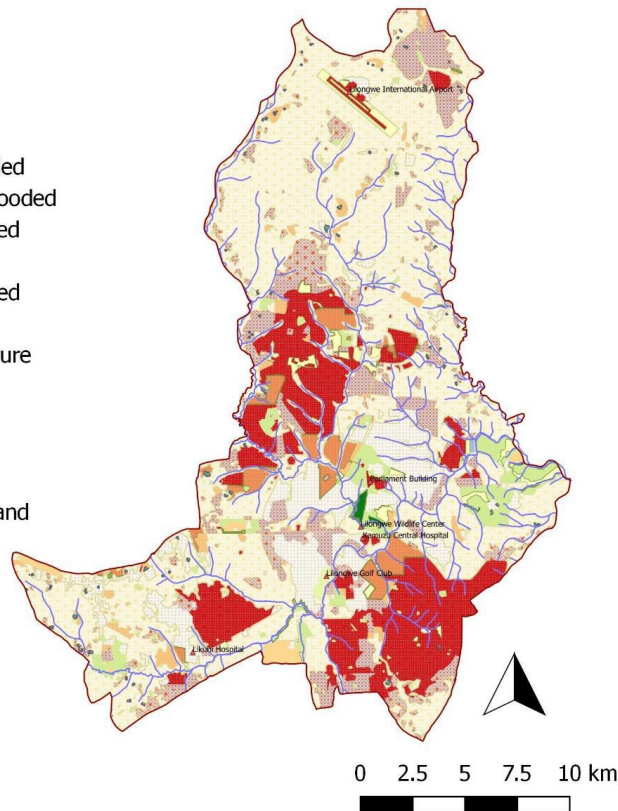


Figure 6: Map illustrating habitats in Lilongwe, Malawi (CRA, 2017: 14)

4.3.4. Assigning priority status to urban natural assets

Following the data collection and initial urban natural assets mapping process, ICLEI Africa together with consultants from CRA and the selected stakeholders from the Malawi's Environmental Affairs Department and Lilongwe City Council had a workshop. During the workshop the collaboration team collectively engaged in a prioritisation exercise where a priority status, ranging from high (4) to low (1), was assigned to areas based on a variety of factors. These factors included opinions of the biodiversity value of habitat/land use categories; biodiversity records obtained through surveys and the perception of stakeholder's in the collaboration team (CRA, 2017). This was supported by interviewees', such as *Participant 4*, who stated that “[they] had one [workshop] in the committee room where [they] were actually identifying these hotspots”.

According to CRA (2017), the areas demarcated as high priority status were areas where no development should take place, while areas assigned with low priority status were deemed preferred sites for development. This was confirmed by *Participant 6*, who noted the following:

“[They] had an engagement meeting with the council, handed over all the GIS [data], and had all the meetings with them and we had workshops with them so we could go through the findings with them and if there were any questions make sure everything is transferred over so they can use it all and that they understand it” (Participant 6).

The data serves as a baseline that is useful for understanding the spatial distribution and extent of areas that contribute to biodiversity within Lilongwe. This data should be augmented by including ongoing biodiversity data and continuous river quality assessments. These data are also useful for informing urban planning and biodiversity conservation and habitat management in the city. An areas priority status was also classified according to its risk to development-associated biodiversity loss (see **Figure 7**) (CRA, 2017: 27). The locations of the urban natural asset hotspots are depicted in **Figure 8**.

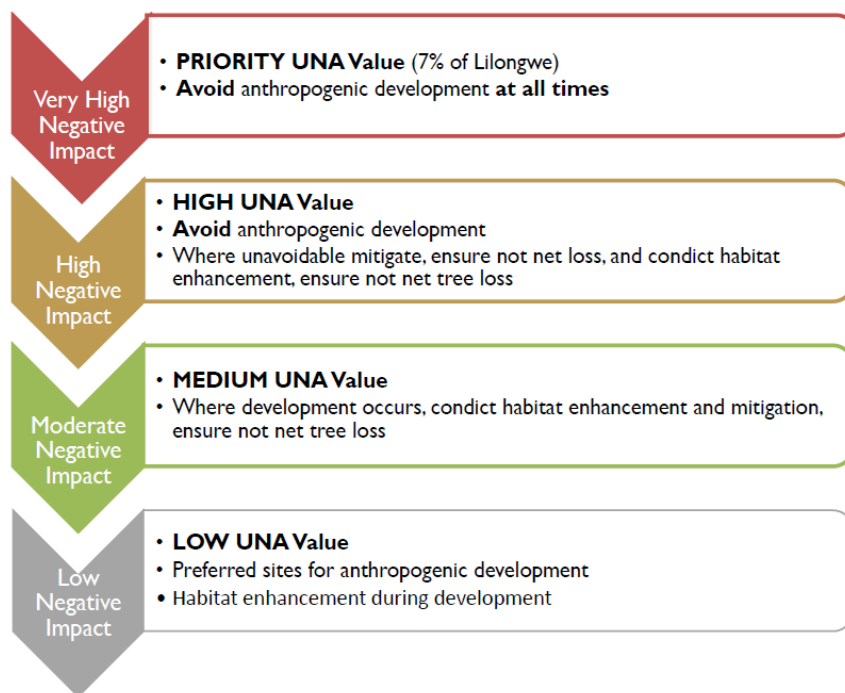


Figure 7: CRA's predicted impacts from development (according to urban natural asset (UNA) value and associated recommendations for mitigation and urban planning (CRA, 2017).

in the collaborative mapping process, particularly related to urban natural assets (see Figure 4), were influenced by contextually specific factors. Firstly, the participants selection process for the collaborative mapping of urban natural asset hotspots in Lilongwe was strategic and ‘very targeted’ to include key individuals who worked in departments pertaining to city planning and environmental decisions in Lilongwe. This supports the point made by Ansell et al. (2020) that collaborative engagements may be more successful if the selection of participants is strategic. According to literature, having a large number of participants may trigger some downfalls (Ansell et al., 2020; Barton et al., 2015). For instance, Ansell et al (2020) suggest that having a larger group may result in the possibility of increasing costs (e.g., transportation or venue costs), could reduce the quality of the discussions, and it may also be unclear as to which participants are “in” and which are “out” of the collaboration. This could result in confusions and ultimately instability (Ansell et al., 2020). However, it is essential to note that, while having too many participants in a collaborative engagement can negatively affect its success, it is important to include key stakeholders as a failure to do so may undermine the effectiveness of the collaboration and, in turn, reduce the likelihood of success.

Secondly, the results suggest that the data collection process undertaken to locate and map the urban natural asset hotspots were influenced by the limited GIS capacity within the Lilongwe City Council, which resulted in the appointment of a consultant from CRA by ICLEI Africa to undertake the data collection and GIS mapping process as opposed to the Lilongwe City Council itself. Despite the house-to-house surveys in the data collection process, the limited GIS capacity meant that the data collection and initial mapping process, using GIS, was not as collaborative and inclusive as it could have been (for example, see Brown, 2012). When it comes to mapping information, stakeholders’ differences in interests, perceptions and knowledge regarding the natural assets need to be taken into consideration (See Garcio-Nieto et al., 2015; Lamaque et al., 2011) The value of including diverse stakeholders and opinions will be discussed in section 5.4.1.

Despite the limited collaboration in the initial GIS mapping phase of the process, Taylor et al (2020: 9) importantly notes that collaborative mapping processes demand time to explore and interpret items, which the collaboration team in Lilongwe might not have had. Moreover, the maps presented to the collaboration team still functioned as conversation starters between stakeholders allowing for the revealing, presenting and exploration of various perspectives, narratives and even social networks in relation to urban natural assets in Lilongwe (Taylor et al., 2020: 3). The various conditions that enhanced individuals’ experiences and perceptions of the collaboration are outlined in Chapter 5.

4.5. Conclusion

The need for an urban natural asset hotspot map together with Lilongwe City Council's inability to accomplish such a task alone (due to limited GIS capacity) and the funding opportunity provided through ICLEI Africa's UNA rivers project resulted in the emergence of the collaborative mapping team. Following the establishment of the collaboration team, the processes undertaken to develop and implement the urban natural asset hotspots map included 6 overarching steps, including participant selection, data collection, mapping urban natural assets (using GIS), assigning priority status to the urban natural asset in order to showcase the location of urban natural asset hotspots in Lilongwe, and lastly, implementation of the urban natural asset hotspots map.

The results suggest that these steps were influenced by specific factors. Firstly, the participants selection process for the collaborative mapping of urban natural asset hotspots in Lilongwe was strategic and very targeted to include key individuals who worked in departments pertaining to city planning and environmental decisions in Lilongwe. Secondly, the results suggest that the data collection process undertaken to locate and map the urban natural asset hotspots were influenced by the limited GIS capacity within the Lilongwe City Council, which resulted in the appointment of a consultant from CRA by ICLEI Africa to undertake the data collection and GIS mapping process as opposed to the Lilongwe City Council itself. Despite the house-to-house surveys in the data collection process, the limited GIS capacity meant that the data collection and initial mapping process, using GIS, was not as collaborative and inclusive as it could have been.

The limited collaboration in the initial GIS mapping phase of the process likely arose due to the limited time constraints. Additionally, and possibly most importantly, the maps presented to the collaboration team functioned as conversation starters between stakeholders allowing for the revealing, presenting and exploration of various perspectives, narratives and even social networks in relation to urban natural assets in Lilongwe.

Chapter 5: Participants experiences and perceptions of the collaborative mapping process

5.1. Introduction

This chapter aims to showcase the results relating to objective b) the role, experiences and perceptions of the actors involved in the collaborative mapping process regarding its usefulness for knowledge sharing and learning, practical application and further interaction and cooperation. Section 5.2. highlights the various conditions that were perceived to be present in the collaborative mapping process that helped to enhance collaboration amongst participants. Section 5.3. presents how, through study participants' experiences and perceptions, such collaborative mapping processes could be made more effective in future in various contexts. Under section 5.4. these findings are discussed in relation to the trends found in literature under three interlinking sections.

5.2. Conditions enhancing the collaborative mapping experiences

From the interviews, it became clear that a suit of factors and elements (both planned as captured in Chapter 4 and emergent) enhanced participants' experience of the mapping process and in turn, influenced their perceptions of collaboration. These factors and elements include flexibility in roles and responsibilities, keeping the numbers of collaborators to a manageable number, inclusion of diverse stakeholders and opinions, opportunities to build relationships and trust, and lastly, willingness to participate (see Table 5 at the end of the section). These are outlined and unpacked below.

5.2.1. Flexibility in roles and responsibilities

Participants individual roles throughout the urban natural asset hotspots mapping process were to a large extent fluid and dynamic – shifting throughout the entire process. More specially the facilitative leadership of the collaboration seemed to be shared and transferred between the participants. For instance, Participant 7 from ICLEI Africa was the convener responsible for initiating and kick-starting the collaborative mapping process and engagements. This role was the result of various factors, the main one being ICLEI Africa's financing of the various aspects of the workshops and engagements through the UNA Rivers project. According to Participant 7, ICLEI Africa organised and paid for both the venue and food needed for the various workshops and engagements, the per diems for attendees, send out invitations and facilitate the initial discussion. However, as the mapping process progressed, the leadership role organically shifted to other participants from the Lilongwe City Council. For example, Participant 7, stated the following:

“... We held that space in the very beginning – probably for the first 3 or 4 engagements – and then we started slowly handing it over to the city where the city council would open the meetings

and then they would facilitate, with [Participant 6], the whole thing and we were kind of like a fly on the wall. So, we still provided the venue and the food, but the facilitation and stuff was handed straight over to the City by the end...so they were the ones who were like starting to talk about how to take it forward internally and what they needed to do etc.”

5.2.2. Inclusion of diverse stakeholders and opinions

From the interview findings, including a diverse range of stakeholders and opinions was considered to be a valuable element to the collaborative mapping process as well as future collaborations relating to the topics of nature and biodiversity.

Several participants highlighted various benefits of including diverse stakeholders in the collaborative mapping process, some of which included the opportunity to bring in a range of opinions, knowledge and understandings (which is further discussed in Chapter 6). For example, Participant 4 stated the following:

“we live differently, so me, I may not know everything, but there is someone who lives at the second corner of the city who may know that there is a hotspot elsewhere in the area here
“(Participant 4).

Not only did the collaborative mapping process enable various perceptions and opinions to be incorporated, but it was the first time that the selected participants were collaborating on a topic relating to planning and biodiversity in the city of Lilongwe. This was highlighted by, for example by Participant 3, who stated that *“it was the first time we met on this subject...as a department we had never met before on this”*.

Additionally, it was noted by interviewees that the various stakeholders coming together to collaboratively map the urban natural hotspots gave participants in the collaboration team the opportunity to address many areas of tensions

“People are from different departments, different educational backgrounds, different careers...some from NGO’s, some from government departments. So we are able to bang heads – colleagues where do we have a problem. So, people were able to allocate here, here, here”
(Participant 4).

However, while house-to house surveys were included in the data collection process undertaken by CRA (see sections 4.3.2 and 4.4) what is important to note, is that, while there were participants from ICLEI Africa and CRA involved in the collaboration, there were not any other non-government or civil

society organisation involved in the collaboration team. While having diverse stakeholders and opinions in a collaborative engagement has been found to be a vital aspect to ensuring successful and fruitful collaboration, the number of stakeholders involved in the collaboration is a key aspect that needs to be considered.

5.2.3. Keeping the numbers of collaborators manageable

Participants views during the interviews and focus group discussion highlight that keeping the numbers of stakeholders in a collaboration group to a manageable size enhanced the effectiveness of the collaborative mapping process. For example, one participant stating the following: *“the value of having the same five or six people engage is key”* (Participant 7).

While Lilongwe City Council’s departments all comprise of a small number of people, selecting participants to be included in the collaborative mapping process was also strategic and selective. This was considered to be a beneficial aspect, with one participant stating the following:

“What also worked really well was having that focused collaboration, so making our scope small in that we had those three planners and then those five environmentalists – or I can’t remember the number. We had those in the room each time and we made sure that they could all attend every single engagement” (Participant 7).

From the above statement, it becomes clear that not only was the number of individuals in the collaboration a vital aspect, but that the selected individuals attend all engagements for the collaborative mapping process.

5.2.4. Willingness to participate

Having stakeholders in a collaboration who are willing to participate in the collaboration process was another element that emerged during interviews. For example, Participant 7 stated the following about Participant 6 from CRA:

“I think the trio between me, [Participant 6] and the City did really well together when it was going. [Participant 6] was really wonderful to work with – so was so willing. Like I would say ‘oh the city said something like this’ and she would just redo everything and she would always went above and beyond. So that was really wonderful” (Participant 7).

From this statement, it is evident that the willingness of participants to partake and engage during the collaborative mapping process enhanced the effectiveness of the collaborative mapping process.

Stakeholders willingness to participant in a collaboration speaks to stakeholders' commitment to the collaboration process.

5.2.5. Opportunity to build relationships and trust

An invaluable aspect that interviewees noted as enhancing the effectiveness of the collaborative engagement, was the close relationships that were present between ICLEI African and the participants from Malawi's National Environmental Management Authority and the Lilongwe City Council (see Table 5).

From the perspective of an NGO, Participant 6 noted the difficulty of engaging with state actors when there is no relationship present between the organisation and the state:

“Engaging government is incredibly hard. Getting them engaged in a programme where they are embedded in a team or you are in their team, is a really challenging thing in Malawi. We know that from other departments that we have been working with, like department of Parks, it's so hard” (Participant 6).

Many interviewees from the Lilongwe City Council showcased working closely with the participants from ICLEI Africa by referring to specific discussions they had with ICLE Africa's staff. Participant 2 even stated that they have attended all engagements in Lilongwe that Participant 7 from ICLEI Africa was involved in:

“...I've been to all workshops she has done. International ones I've not been there. But the Lilongwe ones – yes” (Participant 2).

The relationship between the collaboration group members from Lilongwe City Council and ICLEI Africa proved to be beneficial to the collaborative mapping process in Lilongwe. For example, Participant 6 noted that:

“...through ICLEI's involvement and close relationship with the council – you know Participant 7 knew everybody and everybody knew Participant 7 – it was brilliant because they had a relationship with everyone and they knew how it all worked and has a really good understanding of the council and its process and the departments and whose doing what and what links to what...and that's really valuable” (Participant 6).

Table 5: Participants views on the usefulness of the collaborative urban natural asset hotspots mapping process in Lilongwe

Theme	Quote	Participant
Diverse stakeholders & opinions	<i>“There were people from various corners of the city as well as people from different occupations” ... “when there are people from different occupations, if you manage to come together, then it becomes helpful because you hear their views, which can help in the progress of the project.”</i>	Participant 3
	<i>“It was the first time we met on this subject. Otherwise we have met with city council on other issues before. On issues to do with biodiversity and the environment – as a department we had never met with them before on this.”</i>	Participant 3
	<i>“... we live differently so me, I may not know everything, but there is someone who lives at the second corner of the city who may know that there is a hotspot elsewhere in the area here. So, we met. Of course, people are from different departments, different educational backgrounds, different careers...some from NGOs some from government departments...so we are able to bang heads – colleagues where do we have a problem. So, people were able to allocate here, here, here. “</i>	Participant 4
Close relationships	<i>“...through ICLEI’s involvement and close relationship with the council – you know Participant 7 knew everybody and everybody knew Participant 7 – it was brilliant because they had an in with everyone and they knew how it all worked and has a really good understanding of the council and its process and the departments and whose doing what and what links to what...and that’s really valuable”</i>	Participant 6
Willingness to participant	<i>“I think the trio between me, [Participant 6] and the City did really well together when it was going. [Participant 6] was really wonderful to work with – so was so willing. Like I would say “oh the city said something like this” and she would just redo everything and she would always went above and beyond. So that was really wonderful.</i>	Participant 7
Small number of stakeholders involved in the collaboration	<i>“What also worked really well was having that focused collaboration, so making our scope small in that we had those 3 planners and then those 5 environmentalists – or I can’t remember the number. We had those in the room each time and we made sure that they could all attend every single engagement.</i>	Participant 7

5.3. Enhancing effectiveness of collaborative mapping processes

The value of a collaboratively produced urban natural asset hotspots maps (or any other maps) in city planning and development decision-making processes was duly noted by research participants. However, following the collaborative mapping process, interviewees voiced a number of items that could be considered when arranging future collaborative processes in order to enhance the effectiveness of the collaborative processes. These items were then discussed in the UNA Rivers project team focus group via Skype. This section draws together the findings from both sets of methods.

Firstly, several interviewees mentioned that there could have been more group working sessions for the collaborative mapping of the urban natural hotspots in Lilongwe (see Table 7) For example, Participant 5, compared the collaborative mapping process undertaken for the urban natural hotspots in Lilongwe to another collaborative mapping process they were part of, that is the collaborative mapping of ecosystem types for Malawi. Participant 5 got quite enthusiast about the latter process and proceeded to highlight additional factors that drove the success of that specific collaborative engagement. According to Participant 5, the collaborative team also included a diverse range of stakeholders. Each stakeholder had clearly defined roles and everyone agreed on the ecosystem mapping criteria that were to be used. Following the production of the map, continuous collaboration between the stakeholders is still occurring in order to ensure the maps are updated and utilised. *“We did not have a lot of working sessions. Because we are also developing maps now for the ecosystem types – when I compare that process with this one I think it would have been helpful if we had more working sessions”* (Participant 5).

When asked whether continuous collaboration will occur, Participant 5 stated the following:

“yes, because we had set up a task team that is doing these maps, and its composed of a number of institutions. So, everyone has a clear defined role. We have a documentation person. We have divided the task team into three groups – we have the mapping team who do the GIS mapping and what have you. Then we have the documentation team how have to make sure we have the relevant data so we can expand the maps, then we have a policy/ mainstreaming team who take the maps and ensure that they are being used in decision making, implementation and communication products” (Participant 5).

Closely aligned to this, but more specifically to the UNA hotspots mapping process, one of the interviewees noted that there could have been more engagement with city stakeholders in the actual GIS mapping process:

“I think it would have been better to have our GIS team based at the council when they were doing it...like in retrospect I think that would have been better. Or at least spending two days a week there or something, so that they were working alongside the city (Participant 6).”

That said, the interviewee also pointed out how capacity constraints in the city council’s GIS department in terms of time and resources, makes more robust engagements difficult to achieve:

“... I also understand the GIS guy at the city council doesn’t have the time or the remit and that would take quite a bit of persuading from the council to give up their time because obviously they are resource limited already, and to ask for somebody to sit alongside the mapping to learn all of that stuff. But in an ideal world I think that is something we could have done better. We could have embedded more with the council during the mapping process. Um, and same with the river surveys...like it would have been nice to have them come out and do them with the team when the biodiversity work was going on. But obviously it’s very difficult to get that to happen. You know, quite often that’s well some of it is that the team don’t have the time to do it and if their bosses say, you know, you don’t have time to go off and do that, we need to do this this and this, then that’s it. Or you have to pay – you have to pay to get people to come and say look we will give you this amount of money...you will get a stipend if you come. So that’s very difficult. So yeah it’s not always as easy to do as you’d like to think” (Participant 6).

Secondly, interviewees voiced the value that incentives play in ensuring effective collaborations occur, especially financial incentives (see Table 6). For instance, one participant stated that *“it’s hard to get people to engage with you when there is no money involved.”* (Participant 6).

During the focus group discussion, all five UNA team members generally agreed with this statement. For example, one UNA team member (UNA team member 1) noted that when cities do not have the time or the capacity to participate in collaborative processes, funding can act as an incentivising factor to get cities to partake in collaborations.

However, from the focus group discussion it became clear that the role of financial incentives in enticing individuals to attend and participate in collaborative processes comes with some concerns. Finance can be both an incentive and a disincentive depending on the context. UNA team members noted that in certain context, financial incentives, such as paying participants per diems to attend engagements and paying for other costs of hosting collaborations, such as participants transport costs, food costs and venue costs can incentivise individuals to be part of a collaboration. For example, one UNA team member stated that in certain African cities, “you will have a full house if you’ve advertised

that you're going to do per diems before. You will have a full house and then plus some extra" (UNA team member 1).

However, money can also be a disincentive factor for other people. For example, UNA team member 1, used an example of how per diems and funding from external institutions in an African city that has received ample financial support from many institutions over the years has come to be a disincentive for people:

"there is also like a downside...I...feel that at times there is almost this resolute behaviour that like 'o well if we just leave it, someone will just come along and pay for it so then we don't have to'...so it's kind of like a disincentive...because then they know...that they just lay back and just say what they need someone will come along and pay for it at some point. So, in [some cities] the funding thing is a disincentive for them to motivate to do any work until its paid for by external institutions" (UNA team member 1).

From the interviews and focus group discussions not only was finance highlighted it a critical element in collaborations, but it also had various underlying characteristics that resulted in varied experiences in different context. For example, the extent to which finance played a role seems to depend of expectations by stakeholders in cities. UNA team member 1, highlighted this by saying the following:

"this is like learnt behaviour because in places like Dar, where they have had a long historical legacy of institutions coming in to support them...they've learnt that you get paid to go to these sorts of things so now they just don't go to them if they don't get paid" (UNA team member 1).

Similarly, according to UNA team member 2, in another African city where there has not been much development support from institutions and/ or originations, *"the same people come over and over again"* without being paid per diems.

On the back of this, it becomes clear why UNA team member 3 stated *that "it's the expectation and the relationships that you lay down at the start"* with participants in the collaborative process that become an important component when undertaking a collaboration.

Thirdly, Participant 7, noted that the effectiveness of a collaborative engagement could possibly be heightened by having a signed memorandum of understanding (MoU) between the various parties involved in the collaboration. During the focus group discussion with the UNA Rivers project team, one UNA team member drew from a MoU process they are undertaking with another UNA project city, noting the following:

“I’ve been doing like a really long process with Addis, where we are sort of leading up to signing an MoU but haven’t actually done it yet...I don’t know the value of having an MoU yet, but I could say that if one did decide to go that way, it definitely important to lead the process yourself” (UNA team member 1).

The lengthy process of undertaking an MoU was echoed by other UNA project team members. However, one participant also had an additional point, highlighting that from previous experiences through the SureWater project, signing an MoU aided in assigning clear roles and responsibilities in collaborations and in turn held participants accountable and enhanced the buy-in into the project:

“we signed an MoU with all of the cities at the start of the project that laid out their roles and responsibilities and ours. And it was useful in the sense that we referred back to it many times over the durations to make sure that the buy-in and the participation remained the same, and in some cities, they actually then inserted it into the council record that they had this partnership with ICLEI. So, I think it strengthened the buy-in into the project” (UNA team member 3).

Despite the lengthy process of getting an MoU signed, have an MoU was noted to have numerous benefits, for example, UNA team members 3 noted that having an MoU gives city officials a leg to stand one when they receive pushback from their authorities:

“if they have an MoU they have the excuse to say to their directors ‘well we actually signed this MoU, this is what we said we will contribute to the project so we actually have to present, we have to participant, we have to help move this along’” (UNA team member 3).

Moreover, UNA team member 5 drew from her experience as well, noting that having an MoU *“allows for mandated continuation of relationships”* between stakeholders as it outlines the *“method of engagement”*.

In addition, during the interview with Participant 7 from ICLEI, it was noted that, as the organisation funding the collaboration, a lesson learnt and something that needs to be considered for future collaborations for organisations funding collaborations such as the urban natural asset hotspots mapping process, is the procurement procedure of the funding organisation (see Table 7).

Another key aspect that was seen to be invaluable to enhancing the success of collaborations, is the presence of “champions” in a collaboration process. Again, this was something noted from the organisations involved in the collaborative mapping process.

Following the focus group discussion with the UNA team members, there were a number of considerations the team members noted as essential aspects to keep in mind in relation to champions.

These include, the value of having more than one champion, having the champions involved in the collaboration process from the beginning and lastly, when selecting a champion, they should be individuals that have a job title or role that puts them in a position of power to drive the collaboration process and they should have a high level of ownership over the process. See quotes in Table 6 below.

Table 6: UNA Rivers team members' considerations to bear in mind with champions

Considerations	Quote	Participant
Having more than one champion	<i>"you need to make sure that you sort of don't have one champion but that you basically have a team of champions, so if that one person leaves, the whole team is capacitated"</i>	UNA team member 1
	<i>"it's about a family of champions. So, I think that's the real issue we feeling in these cities now that there was only one champion, so it's about a family of champions."</i>	UNA team member 5
	<i>"you need more than one person because of staff turnover."</i>	UNA team member 3
	<i>"... having a champion who isn't not within the government is very important because you would avoid the staff turnover issue and you would ensure that you have that relationship with that person no matter what and they can always refer you to the right people."</i>	UNA team member 4
Involving champion from the beginning	<i>"but Margret wasn't so involved in UNA before so where as Denis was – he has this amazing buy-in and we would have been perfect just to carry on. Now its Margret whose like uninterested and obviously we can't go there so I can't like get her all excited and get her enthusiastic face to face. So ya its very interesting. "</i>	UNA team member 1
Champions should be in a position of power/ authority and need to have ownership of the collaboration	<i>"the value of a champion you cannot put a price on it, it's literally the make or break for your project, but then that person should still be quite high up so they can make decisions"</i>	UNA team member 1
	<i>"We had the most amazing champion at the start of the project who just drove it, who got the right people, he had power to get people to attend and that sort of thing. Um, and he had a lot of respect from the different departments and I think this comes into the political...also the departments, I think, are supporting the political party he was part of whereas with the new mayor and the new political party I don't think they had as much pull on the departments to attend and that. So, I think that also plays a part – how much power you've got. How much power and how respected you are by the different departments and the people under you, as a champion."</i>	UNA team member 2

Table 7: Participants perceptions on how collaborative mapping process can be made more effective in future in multiple contexts

Theme	Quote	Participant
More group working sessions	<i>“We did not have a lot of working sessions...I think it would have been helpful if we had more working sessions.”</i>	Participant 5
	<i>“I mean I think I would have liked to have more direct engagement with the city council. I kind of felt like we got on with it a bit”</i>	Participant 6
Incentives & funding	<i>“...a lot of times people are so busy and so resource limited that it’s like ‘another person wants to have a meeting with me’, ‘why am I going to this?’, ‘what’s the point?’. Unless you’ve got something that’s going to benefit – you will arrange meetings and people just don’t turn up.”</i>	Participant 6
	<i>“...quite often, to be brutally honest, it’s hard to get people to engage with you when there is no money involved. “</i>	Participant 6
Having an Memorandum of understanding	<i>“signing an MoU with the city in that the things that came out of this process have to be taken forward and that’s the only reason we are going to support this process so that discussions were actually in their KPI/KPAs, so that they did them because that’s the only way I can see... maybe an MoU/ KPI/KPA would mean that they have to do it and that probably links back to the city’s budget, so that they have that ownership”</i>	Participant 7
Procurement procedure	<i>“one is the procurement, I think if ICLEI had the policy where we could give the city council the money and then they follow their procurement and ran the whole process with us supporting, it might have helped because they might have had a better sense of ownership, but at the same time that risk is massive because probably nothing would have been done and they would have taken that money. So that’s a potential that we could have created better ownership processes for the city”</i>	Participant 7
Having champions	<i>“stick to one focal point so that that’s the person that is responsible for running the process. I would take risk management of that high turnover, because I mean we lost 3 key individuals in the process that I think would have made change with institutionalising the map. I don’t know, we didn’t have the head of planning – they came to the first ever meeting, and then he didn’t come again. So maybe I should have pushed harder there, but I tried my best and he just never came.”</i>	Participant 7

5.4. Discussion

5.4.1. Conditions enhancing the collaborative experiences

The findings suggest that there are certain conditions that enhance participants experience of the collaborative mapping process in Lilongwe. These conditions, included flexibility in role and responsibilities; the inclusion of diverse stakeholders and opinions; keeping the numbers of collaborators to a manageable size; that the collaboration was an opportunity for stakeholders to build relationships and trust; and lastly, the willingness of stakeholders to participate played an essential role in the collaboration.

In line with trends found in the literature, having flexible and dynamic roles in collaboration teams, especially in terms of the facilitative leader role, is seen as a critical condition to ensuring successful collaboration. According to Ansell et al. (2020: 6) facilitative leaders attract and retain stakeholder's commitment to collaborations by, amongst others, fostering shared motivation amongst participants, ensuring that authentic and constructive conversation occur. The flexibility of the leadership role in the collaboration team is supported by Bryson, Crosby and Stone (2006) who hold that leadership in collaboration teams are more likely to be shared and transferred between group members.

Mayer and Kenter (2015) highlight that effective leadership requires a strong convener or someone who responsible for initiating the tasks needed to kick start the collaboration process. In the collaborative mapping process undertaken in Lilongwe, the findings show that ICLEI Africa's UNA Rivers project team play a large part in initiating the tasks required to kick starting the collaboration, especially given their access to the funding for the collaboration. This also aligns with points raised by Bryson et al. (2006: 47) who argue that there are two vital leadership roles in collaboration teams – sponsors and champions. Sponsors refer to people who have considerable authority, prestige and access to resources that can be used on behalf of the collaboration group. Champions, on the other hand, refer to people who focus on keeping the collaboration going and assist the collaboration group to meet its goals (Bryson et al., 2006: 47).

With regards to the former, the findings suggest that ICLEI Africa largely funded the collaboration and in turn, steered a lot of the initial collaboration engagements. Similarly, Head (2009) stipulates that funding organisations often play significant roles in initiating and financially sustaining collaboration teams. As a result, organisations fulfilling the funding role can significantly influence the dynamics of the collaboration team (Head, 2009). Not only do the results showcase the important role that the UNA Rivers project team played as sponsors and thus leaders of the collaboration, but

they also highlight the importance of champions in collaborations, which will be touched on later in this section (see Table 6 in section 5.3).

Similar to trends found in literature (for example, see Ansell et al., 2020; Ansell & Gash, 2012 & Mayer & Kenter, 2015) including a diverse range of stakeholders and opinions in the collaborative mapping process was found to be a valuable element to the collaborative mapping process as well as future collaborations relating to the topics of nature and biodiversity. According to Mayer and Kenter (2015: 51) including a diverse group of stakeholders in a collaboration brings a variety of perceptions and resources together. This held true in the collaborative urban natural asset mapping process, where the inclusion of diverse stakeholders in the collaborative mapping process was said to have brought in various opinions, perceptions and understandings as well as opportunities to build new relationships for stakeholders (see section 5.2.2. and Table 8). The number and variety of people involved in the collaboration is found to be a vital aspect (Connelly, 2008: 22). However, determining the number and variety of stakeholders in a collaborative process remains a contested issue (Ansell et al., 2020). On the one hand, including a wide number of individuals in a collaborative process can allow for more in-depth and richer discussions and learnings as well as enhance the individual's ownership of the collaborative process and the desired outcome of the collaborative process. According to Ansell et al. (2020: 2) not including key stakeholders into the process can possibly reduce the effectiveness of the collaborative process by excluding valuable knowledge and resources and, in addition, could increase the possibility of some stakeholder refusing to co-operate in downstream implementation.

On the other hand, however, including a wider number of individuals into the collaborative process could, amongst others, increase costs and reduce the quality of discussions. As a result, collaborative process may be more effective and successful if a small number of participants are strategically selected (Ansell et al., 2020; Connelly et al., 2008). Participants views during the interviews and focus group discussion support this. However, as noted in Chapter 4, selecting which participants, organisations and/or institutions are part of the collaboration is a vital aspect to consider, especially if the collaboration includes a small number of people. Connelly et al. (2008: 27) hold that when one has a relatively small number of people, organisations and or institutions involved in a collaborative engagement, decisions are met and made more easily. While the small number of stakeholders was found to be beneficial to the collaborative urban natural asset hotspots mapping process, from literature, it can be argued that the participants selected did not include a very diverse range of stakeholders in the collaboration team.

One of the ICLEI Africa participants not only had a close relationship with members from Lilongwe City Council but also had a sound understanding of Lilongwe City Councils governance structures and processes. In addition, ICLEI Africa also had a sound relationship with the participants from CRA, which also contributed to the overall effectiveness and efficiency of the collaborative mapping process. The relationships formed were built on the foundations of trust between ICLEI Africa staff and the Lilongwe City Council due to the long-term engagements between them. According to scholars, trust is a key aspect to relationships which also manifests in interpersonal behaviour and confidence in the competence of fellow stakeholders (Ansell & Gash, 2007; Bryson et al., 2015; Siddiki, Kim & Leach, 2017). Trusting relationships have been found to facilitate the work of collaboration and hold the collaboration together (Bryson et al, 2006). Trust can comprise interpersonal behaviour, demonstrating competency, good intentions, a sense of good-will and follow-through (Bryson et al, 2006).

The results suggest that the willingness of participants to partake and engage during the collaborative mapping process enhanced the effectiveness of the collaborative mapping process (see section 5.2.5). Stakeholders willingness to participate in a collaboration speaks to stakeholders' commitment to the collaboration process (Alexander, Comfort, and Weiner 1998; Gunton and Day 2003; Margerum 2001; Tett, Crowther, and O'Hara 2003 in Ansell & Gash, 2012: 559).

5.4.2. Effective collaborative mapping processes

From the interviews and the focus group discussion, five factors were highlighted as items that could enhance the effectiveness of future collaborative mapping process. These factors included having more group working sessions and engagements with city stakeholders in the actual GIS mapping process; incentives and funding; having an MoU; a change of procurement procedures; and the presence of champions in the collaboration process.

Mayer and Kenter (2015) explain that having open and frequent lines of communications is highly beneficial to the collaboration group. Not only does such communication aid in shared understanding, visions and goals amongst stakeholders, it is also promotes information sharing, knowledge generation and healthy dialogue. My findings align with this as some participants noted that having more engagements with the collaboration group would have been beneficial. In particular, in terms of the GIS mapping process, the consultant pointed out that there could have been more engagement by stating the following *“I think it would have been better to have our GIS team based at the council when they were doing it...like in retrospect I think that would have been better. Or at least spending two days a week there or something, so that they were working alongside the city”* (Participant 6). Having a more participatory GIS approach for the urban natural assets mapping process, could have

built capacity in the City Council's GIS department in terms of understanding the maps and how to update them over time and, in turn could have made the collaborative mapping process more effective. According to Tripathi and Bhattary (2004) when it comes to participatory GIS, the availability and knowledge of the GIS technology itself needs to be considered. If there is limited availability and knowledge of GIS technology, the maps will become outdated and impact the extent of their usefulness in decision-making.

While collaborative approaches might sometimes be mandated by court or legislation, people's participation in collaborations are typically voluntary (Ansell & Gash, 2012). Therefore, according to Ansell and Gash (2012: 552) understanding the incentives that stakeholders have to engage in collaborations and the factors that shape those incentives are very important. Incentives, especially financial incentives, were found to play a valuable role in ensuring the occurrence of effective collaborations. *"It's hard to get people to engage with you when there is no money involved"* (Participant 6). This supports Ansell et al.'s (2020:4) statement, that financial realities and considerations play a crucial role in collaborations. From the interviews and focus group discussions not only was finance a critical element for the collaboration, but it had various underlying characteristics that resulted in varied experiences in different context. The extent to which financial incentives played a role in enhancing the success seems to be context specific, depending on the expectations of the collaboration group.

In addition, the findings highlight the possible role of having a signed MOU's between various parties in order to enhance the effectiveness of a collaborative engagement. MoUs are formalized agreements of mutual expectations between two organizations or groups. (Johnson & Sterthous, 1982; Zahner, 2001). Amongst others MoU's have been found to be useful for coordinating and specifying roles and responsibilities, facilitate communication processes (Bryaon et al., 2006; Johnson & Sterthous, 1982; Zahner, 2001)

Similar to findings in this study, Head (2008) notes how groups in the Sacramento Water Forum Agreement, which was a collaboration that encompassed various state and non-stake groups, agreed to support the principles and tasks in the Water forum Agreement through a formal MoU. Similarly, Booher (2007) found that negotiating rules and signing agreements, such as an MoU, is a key aspect to getting stakeholders to participate in a collaboration and ensuring the success of the collaboration. Emerson and Nabatschi (2015) also showcase how MoUs have been used in terms to promote coordination between national and sub-national levels of government.

Study participants noted that the procurement procedure of the funding organisation can play a huge role in a collaborative engagement. Given that ICLEI Africa has a specific procurement process that had to be followed, it inevitably shaped underlying features of the collaborative engagement. According to Aputo (2017) the type of project procurement method used to deliver a project can influence the performance of the project. As briefly mentioned, the presence of champions in a collaboration were noted to be extremely valuable in ensuring successful collaboration. The themes that emerged during the focus group discussion with UNA team members, including having more than one champion, involving champions from the beginning, and that champions should be in a position of power /authority and need to have ownership over of the collaboration (see Table 6) align to certain findings in literature. For example, Agranoff (2012) notes that collaborations need one or more consistent champions involved who have higher levels of authority. In addition, Bryson et al. (2016) highlights that collaborations are more likely to be successful if champions are not only consistent, but also if they come from many different levels who can provide formal and informal leadership.

5.5. Conclusion

The collaborative urban planning mapping experience for most of the interviewees and focus group respondents was perceived to be useful and beneficial. My findings suggest that, similar to findings in literature, a number of conditions helped enhance their experiences of the collaborative mapping process. These included: the flexibility of stakeholders' roles and responsibilities; the inclusion of diverse stakeholders and opinions in the collaborative mapping process; keeping the numbers of collaborators to a manageable size; and having stakeholders that are willing to participate in the collaborative mapping process.

However, while these conditions may have enhanced the effectiveness and experiences of the collaborative mapping process, there were some factors that were raised and suggested for enhancing future collaborative mapping approach. These factors included having more group working session and engagements with city stakeholders in the actual GIS mapping process; incentives and funding; having an MoU; a change of procurement procedures; and the presence of champions in the collaboration process.

Chapter 6: Informing urban planning through collaborative mapping

6.1. Introduction

This chapter unpacks and discusses the results relating to objective c) how and to what extent the collaboratively produced urban natural asset hotspots map has been able to inform urban planning and foster collaborative governance in Lilongwe. Section 6.2 provides interviewees' views on the benefits of the collaboratively produced map; and section 6.3. highlights the reasons voiced by interviewees for the limited use of urban natural asset hotspots map to inform city planning decisions. These findings are then be discussed in section 6.4 in relation to the literature.

6.2. Benefits of collaboratively produced maps

The consensus among the interviewees was that the urban natural asset hotspots map produced through the collaboration process is valuable and highly informative for the city of Lilongwe. Participant 4 noted the value of maps, stating that *“maps are key”*. This was supported by other participants as captured in Table 8. For example, participants highlighted that maps serve as an *“inventory of information”* (Participant 3); that *“maps show what is on the ground, what people intend to do on the ground”* (Participant 2); and that they can guide decision makers (see Participant 3's quote in Table 8).

In addition, interviewees noted that maps can facilitate fruitful discussions and enable problem-solving. For example, Participant 4 said the following: *“we are able to bang heads – colleagues where do we have a problem. “*

This aligns to the results in both Chapters 4 and Chapters 5, where the mapping process was highlighted as a conversation starter (for example see section 4.4) and an enabler of collaboration (see sections 5.2 and 5.4). Interestingly, the visual representation of information in maps can be considered to be a correlating factor to the usefulness of the map. Participant 6 noted that *“maps are very visual – so everyone likes that you know – whereas a report, you like “oh” it sits on the shelf. But if you give them a map, with is nice and annotated and its, you know, very visual, everyone can interpret... then that tends to get people's attention”*.

Table 8: Participants perceptions on the benefits of the collaboratively produced urban natural asset hotspots map for Lilongwe

Participant	Quote
Participant 1	<i>“The fact that development is going the opposite direction does not mean that things like this are not needed.”</i>
Participant 2	<i>“they are very valuable maps because they show what is on the ground, what people intend to do on the ground”</i>
Participant 3	<p><i>“because we are able to match what work to do...it guides us. If we are talking about an area at least we have preliminary knowledge about it scientifically – this area on the map, its biodiversity is so so so so. When we are at our technical committee meetings of town planning, normally they expect this department to say something about the project or program that is going on there. So the fact that we know, through that mapping, we are quick to respond and say “well you know that area..um...there are also a b c d that need to be taken care of” because we know that through this inventory of information. Without this information we would not be able to be say and contribute what we have been contributing. Ya so, to say the least, the information has been helpful”</i></p> <p><i>“used by this department which is responsible for environmental screening. So, I am saying it has helped us when we have been asked to comment on certain plan or project or something that wants to be constructed and requires permission from the town planning. So as a department we are using that information. Because the town planning committee believe us as environmentalist, they are using it. So that’s how the information is finally helping the town planning.”</i></p>
Participant 4	<p><i>“... maps provide guidance. We...sometimes when you don’t have information you don’t have to get onto the site to collect data. Sometimes it is possible to get everywhere, but sometimes it’s not possible. Now where you have a problem and maps have been generated, they can even provide a proper guidance as to where a particular problem is within a particular area. Even without you physically getting to that spot, you can be guided. To say that we have are here...here...and here.”</i></p> <p><i>“...we are able to bang heads – colleagues where do we have a problem. So, people were able to allocate here, here, here. “</i></p>
Participant 5	<i>“...it [the map] can give a picture of what can be done, what’s found where and what can be done where.”</i>
Participant 6	<i>“They [the maps] look very pretty to them [the Lilongwe City Council]. They say that maps are very visual – so everyone likes that you know – whereas a report, you like “oh” it sits on the shelf. But if you give them a map, with is nice and annotated and its, you know, very visual, everyone can interpret...um then that tends to get peoples attentions”</i>

While the urban natural asset hotspots map produced was useful in facilitating collaboration (See Chapter 5) and had the numerous benefits outlined above, the hotspots map has not been mainstreamed and utilised to inform city planning decisions in Lilongwe to the extent it was expected to. The reasons for this are discussed in the next section.

6.3. Reasons for limited use of urban natural asset hotspots map to inform decision-making

Despite the strong opinion regarding the need and usefulness of the map, most of the research participants believed that the collaboratively produced urban natural asset hotspots map has not been used to its full extent to inform city planning and development decisions within Lilongwe. Several reasons for this were mentioned. One reason noted was the outdated laws and regulations guiding city planning and development in Lilongwe (see Table 9). For example, one interviewee stipulated the following: “...in the Town Planning Act, you’re definitely not going to find this [map], because it is an old document. You aren’t going to find were they refer to using such a map” (Participant 1).

Additionally, some interviewees expressed that, while the city planning and development laws and regulations need to be updated to include the information displayed in the hotspot map, a key challenge over and above this, is the politics and possible corruption hindering the enforcement of these laws and regulations:

“The regulations, the laws, the provisions – they are there to enable us to do the enforcement. The people might be there. But you will find that they cannot enforce. The moment you start enforcing it becomes political. So, it’s largely political. Then because of that, issues of corruption creep in.” (Participant 1).

From this, one can argue that even if the urban natural asset hotspots map was mainstreamed and incorporated into city planning laws and regulations, enforcing those regulations will be a challenging and controversial task. Even if the laws and regulations were up to date, city officials “cannot enforce” them (Participant 1), with some participants noting that “the moment you start enforcing it becomes political” (Participant 1). Participant 1 continued on the issue of enforcing city planning decisions stating that “when it turns political you are there to suffer as an individual. You are there doing your job, but somebody sees it as if it’s your...personal opinion” (Participant 1).

Beyond the political challenge associated with enforcing city planning laws, practices and decisions, a lack of appropriate tools and equipment, such as GIS technology and vehicles for enforcement, were also common challenges brought up by interviewees. For example, certain interviewees noted that ensuring people adhere to the planning laws and decisions made in relation to development requires the enforcement officer to be mobile and to have support from other enforcement officers:

“...For you to enforce you must be very mobile... [but there are] no vehicles. For you to enforce you must have the backing of the upper so that when you apprehend somebody or something at

least somebody will...but you will be there fighting as if it's your personal...you know"
(Participant 1).

An additional reason for the limited use of the map by city planning decision-makers included the fact that the City Council does not own a lot of the land in Lilongwe. For example, an interviewee from the Lilongwe City Council highlighted that:

"because the land does not belong to us, [developers] also go and intimidate the people who are responsible for issuing land hey. They will just come to you as an officer and say 'I want this place' and they are not expecting a no from you. You cannot say 'ah but that area is reserved for ecological...' they want it " (Participant 1).

From this, it is evident that this interviewee believes that, even if the hotspots map were to be used to inform city planning decisions at the City Council level, this could be overturned. For instance, should the decision not be in favour of the development proposed by developer, there may be intimidation to override the decision.

Regarding the lack of GIS equipment and skills as an attributing factor to the limited use of the urban natural asset hotspots map, one interviewee had the following to say:

"...basically, it is because of lack of expertise in employing" ... "that expertise is yet to be there because our GIS department is not well trained, so to say, so they are not really supporting us"
(Participant 3).

In addition, while interviewees did not note this explicitly, it can be argued that the inclusion of a consultant (rather than the City Council) in the initial data collection and actual mapping of the data in QGIS could attribute to the limited use of the map (See sections 4.3, 4.4, 5.3 & 5.4)

Table 9: Participants views on why the urban natural asset hotspots map is not being used to inform city planning and development in Lilongwe

Theme	Quote	Participant
Outdated laws & regulations	<i>“when it comes to policies and overarching legislation there is that challenge...you cannot just embrace it [the map] without knowing how it is going to affect. You feel that I must be careful to remain traditional so to say, traditional methods we are used to and that are acceptable.”</i>	Participant 3
Politics of enforcing laws & regulations	<i>“The regulations, the laws, the provisions – they are there to enable us to do the enforcement. The people might be there. But you will find that they cannot enforce. The moment you start enforcing it becomes political. So, it’s largely political. Then because of that, issues of corruption creep in” ... “when it turns political you are there to suffer as an individual. You are there doing your job, but somebody sees it as if it’s your...personal opinion.”</i>	Participant 1
Lack of capacity, in terms of skills, appropriate tools & equipment	<i>“There is now a lack of appropriate tools and equipment you know – things like for you to enforce you must be very mobile... [but there are] no vehicles. For you to enforce you must have the backing of the upper so that when you apprehend somebody or something at least somebody will...but you will be there fighting as if it’s your personal...you know”</i>	Participant 1
	<i>“...basically, it is because of lack of expertise in employing” ... “that expertise is yet to be there because our GIS department is not well trained, so to say, so they are not really supporting us.”</i>	Participant 3
	<i>“there is a GIS unit, but it is not very functional. We don’t have equipment...and the human resources educated to pursue the GIS unit”</i>	Participant 4
City does not have ownership of land	<i>“...the Lilongwe city council, as a local authority, is given this mandate to do development control after the plans have been prepared.”</i>	Participant 1
	<i>“because the land does not belong to us, [developers] also go and intimidate the people who are responsible for issuing land hey. They will just come to you as an officer and say ‘I want this place’ and they are not expecting a no from you. You cannot say ‘ah but that area is reserved for ecological...’ they want it .”</i>	Participant 1
Limited funding	<i>“the problem [with taking these maps forward] is funding you see”</i>	Participant 2

However, while the map is not being widely used, there were a few interviewees who noted that they make use of the map as needed. For example, participant 3 stated that while their department is “*not fully utilising the map, if any [they] are just using the hard copy version*”, it “*has opened has opened the doors to be more inquisitive about other things as you observe them unfolding in the city*” (Participant 3).

In addition, Participant 5 noted that the urban natural asset maps aided in the categorisation process of the National Ecosystem Maps for Malawi, stating that “*because we were layering all the maps that are there to see what kind of attributes they have...so it will define what that will mean in terms of or categorisation. Like here (Participant 5 points to map) its unnatural and here (Participant 5 point to different section of map) its natural.*”

Moreover, some participants, such as Participant 4 (see Quote in Table 9 above), noted that the issue of poor budgeting and a lack of funding within the City Council affected the Council’s ability to implement and take the map forward in decision making processes. Participant 4 unpacked this and noted his departments role in overcoming this challenge stating:

“[When] you come up with an intervention, you have to finance it...Every year we convene budget session meetings. During the budget session...[we] are planning activities for the next financial year and those activities are budgeted. So, at the end of the day you have a budget for the activities that will be undertaken in the next financial year...So, when you are implementing it means there is money already attached to it... This planning takes place at around March. Our financial year is July to June” ...” in the first of March we like to introduce the maps to the town planning committee. Town planning committee chair will take the maps to development committee chair for deliberations. Development committee chair will take the maps to the full house of councillors which is referred to as full council for adoption. Once that has been adopted they must be included in the activities of the council when we are doing the budgets. Because if they are adopted by the council they are owned by the people – the council represents the people.
“(Participant 4).

Participant 4 points out a plan for March 2021 in which the City Council will be discussing budget allocations related to the implementation of the urban natural asset hotspots map. While this participant aware of this it is clear that the other departments are not indicating a need to increase communication across departments in the City Council.

While the proposed planning towards assigning and allocating budget for the mainstreaming of the hotspots map into city planning and development decision-making processes is a step in the right direction, it needs to be updated on a regular basis. Participant 6, highlighted the following:

“[the] maps that we produce [are] only as good as probably a month around the time when they were mapped, um...because everything is so dynamic, that everything could probably change. Unless those maps are done regularly we don't know what the level of change is on average.”

(Participant 6).

Recognising the importance of monitoring and updating the maps regularly, Participant 1 highlighted the outdated information reflected in the maps produced in 2017, stating:

“Like all the areas that you have shown me – the hot what – they are not hot[spots] on the ground. They not hot[spots] on the ground [laughing]. Of course, with the exception of maybe the botanical garden. But if you go to the other area which I said is near the Lilongwe river, the water board and what have you, its...it's pathetic. You go to this area, Kauma, where I said there are sewerage works and what what – its densely populated with unplanned settlements

“(Participant 1).

Importantly, while there has been limited updating and use of the urban natural asset hotspots map in informing city planning decisions and processes in Lilongwe, the collaborative mapping process was successful in transforming the way departments work:

“They really created these relationships which we see are taken forward in various ways and I can give you examples of how the planners and environmentalists are working better together as a result of that process, but they aren't working on the maps, which was our output. So what is better, that they not collaborating on the maps however they are collaborating on other things that really help them too” (Participant 7).

This again, highlights that, despite the limited use of the maps produced, the collaboration created relationships between individuals which led to collaboration in other aspects of their work.

6.4. Discussion

From the interviews (see section 6.2), it is evident that the visual representation of the urban natural asset hotspots in the form of a map was well received. Black and Anderson (2012) similarly highlight how the visual representation of the information in the form of a map played a valuable role in facilitating discussions and shaping consensus amongst actors. As such, it can be argued that the collaboratively produced urban natural asset map functions as a boundary object (see Black &

Anderson, 2012) providing a visual representation of different participants' perceptions of the complex, and sometimes disputed, topic of natural asset hotspots in Lilongwe. This shared understanding in turn fostered new relationships and interactions between individuals and departments, including in other areas of their work. Huxham (1993) similarly found that such collaborations can help resolve co-ordination problems that may be present between departments in relation to urban planning decisions and processes relating to nature, while Doberstein (2016: 822) note that some of the best collaborations are transformative for the participants involved in the sense that they do not leave the same way as when they came in. The collaborative mapping process described in this study, thus, not only opened conversations and facilitated collaboration, but helped to transform the way certain decisions are being made in the Lilongwe City Council, especially in relation to city planning practices. This in itself is a noteworthy outcome.

While the value of the urban natural asset hotspots map was recognized for the enabling role it has played in facilitating collaboration, all interviewees felt that the map was not being used effectively to inform city planning and development decisions particularly in relation to urban development. This is contrary to Head's (2008) point that such a collaboration should be helpful in improving the quality and effectiveness of implementation. Multiple reasons were put forward for the limited use of the urban natural asset hotspots map. One of the most frequently expressed and highly emphasised reasons for the lack of uptake of the map was that the city planning laws and regulations used for decision-making processes are infrequently updated and so make no reference to the use and value of such a map. In addition, the results suggest that even if the laws and regulations were up to date, city officials may struggle to enforce these as issues of politics often emerge in the contested space of land availability and allocation for different uses. According to literature, how mapped information can be used to inform and support policy making is only recently receiving more prominence (Wright, Eppink, & Greenhalgh, 2017). Asikain and Jokinen (2009) argue that city planning is not only a social and technical process, but also a political process. Therefore, when developing an urban natural asset hotspots map to enhance sustainable planning decisions and practices, not only do they need to speak directly to the policies used, but the politics associated with the implementation of such maps need to be analysed and considered.

Given that the context within the City of Lilongwe was highlighted as being very dynamic, particularly with respect to land use, it is essential that tools such as the hotspots map are kept up to date. This requires on going monitoring of changes on the ground and remapping to ensure the map remains relevant and is able to provide insight into natural asset conservation (Bekessy et al., 2012). However, this has proved to be a challenge in Lilongwe. Numerous interviewees noted that

the Lilongwe City Council GIS unit is not very functional due to a lack of equipment, capacity and expertise in the field. Wright, Duncan and Lach (2009) highlight the socio-political challenges inherent in using GIS technology including the issue of data and software accessibility. Without access to GIS data or software imbalances can occur between the map makers and the map users. The lack of equipment and expertise in the Lilongwe GIS department, means that updating the maps (which needs to be done on an annual basis) cannot be effectively done by the Lilongwe City Council even though they were provided with the GIS shape files needed to do so. Consequently, without regular updating, the map could quickly become redundant and forgotten.

Other factors limiting the use of the maps related to the fact that most of the land in Lilongwe does not belong to the City Council. As a result, developers, for example, were often said to intimidate people who are responsible for issuing land in order to get their development going even if it is in a natural hotspot area. Again, this supports the social, technical and political nature of city planning (Asikain & Jokinen, 2009). Financial constraints were also said to contribute to the city not using the urban natural asset hotspots to inform city planning and development decisions. However, despite the frequent reference to this, one interviewee did note that his department was working on overcoming the issue and that it would be addressed in an upcoming meeting about budget allocations. However, other departments (at the time of the interviews) were unaware of this information, pointing to a need for more frequent and enhanced lines of communications (an important aspect of collaboration) across departments.

Understanding the reasons that limit the use of the urban natural asset hotspot map is valuable for Lilongwe and other African cities and points to a need to gain further insights into the various contexts impacting the implementation of an urban natural asset hotspots map in city planning and decision-making processes. However, regardless of these points, the interviewees continued to point to the mapping processes' valuable ability to open up conversations and facilitate collaboration between the various stakeholders and in turn, the transforming the way certain decisions are being made in the Lilongwe City Council.

6.5. Conclusion

The visual representation of the urban natural asset in the form of a map was well received. However, despite the numerous benefits of the collaboratively produced map voiced by interviewees, the urban natural asset hotspots map is not fully being used with research participants listing a number of reasons contributing to the limited use of the map in decision making, including outdated laws and regulations; politics of enforcing laws and regulations; lack of capacity, in terms

of skills, the appropriate tools and equipment; Lilongwe city does not have ownership of land; and limited funding. However, while the actual map might not be being used to its full extent, the collaborative process was found to not only open conversations and facilitate collaboration (similarly highlighted in Chapters 4 and 5) and departments that often do not work together but helped to transform the way certain decisions are being made in the Lilongwe City Council, especially in relation to city planning practices. Beyond this, the reasons limiting the usability of the map can function as lessons learnt that can help shape the design of future collaborative mapping engagements as well as how to aid the implementation of an urban natural asset hotspots map in urban planning and development decisions.

Chapter 7: Conclusion

7.1. Introduction

This study set out to determine how the process of collaborative mapping of urban natural asset hotspots might contribute to collaborative governance between state and non-state actors in the City of Lilongwe. This chapter provides an overview of the key findings from this study, and what these findings mean both for the management of natural assets in Lilongwe City and for collaborative governance. This is followed by some recommendation on how to take the collaboration and hotspot map forward, before ending off with some final words.

7.2. Key findings and messages

7.2.1 The collaborative mapping process: Stakeholder driven

The collaborative mapping process of urban natural assets in Lilongwe was driven by city officials, arising out of the need for the city to know where critical natural assets are located across Lilongwe. Such a map was required to assist the City Council in making city planning decisions that better incorporate nature. The process was aided through a funding opportunity made available through ICLEI Africa's UNA Rivers project. Additionally, the City Council recognised its inability to accomplish this task alone and hence the need for a process that brought together state and non-state actors across different sectors. The fact that the map emerged as a need by the city played an important role in gaining the local government's support for the collaborative mapping process and in some of the successful outcomes, such as the continued collaboration of some of the actors involved. It is well known that stakeholders' level of participation in a collaboration is often found to increase if they directly benefit from the collaboration in some way (Ansel & Gash, 2008; Emerson et al., 2011).

The participant selection process for the collaborative mapping of urban natural asset hotspots in Lilongwe was strategic and targeted to include only key individuals who worked in departments pertaining to city planning and environmental decisions. Such careful selection of participants has been highlighted by Ansell et al. (2020) as essential for an effective collaboration process. The importance of this is also discussed further below. The pool of participants was further expanded by the appointment of a consultant from CRA by ICLEI Africa to undertake the data collection and GIS mapping process due to limited GIS capacity within the Lilongwe City Council. While bringing in a consultant helped address the capacity constraints, it also meant that, despite the house-to-house surveys in the data collection phase, the data collection and initial mapping process was not as collaborative and inclusive as it could have been.

That said, participants did believe the hiring of a consultant to be the most time and cost-effective way forward. In all such collaborative processes, it is likely, at times, that trade-offs will need to be made between efficiency and continuous engagement and dialogue (Taylor et al., 2020). For the city of Lilongwe's collaborative mapping process, the lack of collaboration around producing the map was somewhat compensated for by presenting the initial maps to the collaboration team. This functioned as a conversation starter between stakeholders, facilitating the revealing, presenting and exploration of various perspectives and narratives in relation to urban natural assets in Lilongwe.

7.2.2 Effectiveness: Collaboration seen as beneficial by participants

The collaborative mapping of urban natural asset hotspots experience, for most of the study interviewees, was perceived as useful and beneficial. In line with literature (see Table 1) focussing on what is required for effective collaboration, this study found a number of conditions that helped to enhance the collaborative mapping process and the participants' experience thereof. Similar to points raised in literature (see Ansell et al., 2020; Ansell & Gash 2012 and Mayer & Kenter, 2015), the inclusion of a strategically selected diverse, but small, set of willing stakeholders with and a range of experience enriched the collaboration process by bringing in different perspectives, knowledges and opinions and helped to enhance relationships and build new ways of working. As noted by Bryson et al (2006), the facilitative leadership role, amongst other roles, was shared and transferred between participants in the collaboration resulting in a very horizontal and equal structure that recognised everyone's knowledge as valuable. In line with Bryson (2006), sponsors and champions were found to be vital roles in ensuring the success of the collaboration team in Lilongwe. According to Head (2009), sponsors or funding organisations often play a significant role in not only initiating but also financially sustaining collaborations. This held true with the collaborative mapping of urban natural assets in Lilongwe as the funding opportunity present through the UNA Rivers project play a massive part in funding the collaboration throughout.

Despite the collaboration being described as useful and beneficial by participants, the product of the collaboration has not yet been used much by the City Council or the group involved in developing it. In these kinds of processes, one of the expected outcomes would be that the collaboration enhances the use of a product like a map as potential users have been part of the process of developing it (Heads, 2008). From this perspective it could be argued that the collaboration has not been as effective as would have been hoped in terms of its primary purpose and goals. This is discussed further below.

7.2.4 Achieving the collaboration goal: Underuse of the map

Despite the perceived effectiveness of the collaboration, the final product – the urban natural assets hotspot map – has yet to be fully put to use. The fact that the reason for the collaboration, outlined in section 7.2.1 above, was to support city planning decisions that better incorporate nature, suggests more needs to be done. A number of reasons were found to contribute to the limited use of the map in decision making, including outdated city planning laws and regulations that do not refer to the map and the politics surrounding the enforcement of these laws and regulations even if they were to be updated. Asikain and Jokinen (2009) argue that city planning is not only a social and technical process, but also a political process. Therefore, when developing an urban natural asset hotspots map to enhance sustainable planning decisions and practices, not only do they need to speak directly to the policies used, but the politics associated with the implementation of such maps need to be analysed and considered. Indeed, how mapped information can be used to inform and support policy making within an complex political environment is only recently receiving more prominence (Wright et al., 2017).

Furthermore, a lack of capacity, in terms of GIS skills and technology in the City Council was also found to limit the use of the hotspot map in decision making processes. The capacity constraints in the GIS department means that updating of the maps on an annual basis cannot be effectively done by the GIS department even though they were given the GIS shape files needed to do so. Without regular updating the maps soon become outdated and forgotten. The power plays and intimidations that link to the fact that Lilongwe city does not have ownership over a lot of the land were also attributed to underutilisation of the map. Highlighting the political nature of city planning (Asikain & Jokinen, 2009), the limited amount of land ownership by the City Councils was found to result in developers intimidating the people responsible for issuing land in order to get their development going, even if it was unauthorised by the City Council and occurred in a natural asset hotspot area. Additionally, financial constraints were commonly noted as a factor hindering the ability to take the map forward in the intended manner. However, one interviewee did note that his department was working on overcoming the associated budgeting issue, pointing to the need for more frequent and enhanced lines of communications – a factor that is considered to enhance the likelihood of success in collaboration (Mayer & Kenter, 2015). Collaborations with poor communication amongst stakeholders can have various inter- and intra-organisational challenges that can affect the collaboration and the relationships of the stakeholders within it (Ferreyra & Beard (2007, in Mayer & Kenter, 2015).

7.2.5 Future collaboration: Suggestions for enhancement of collaboration processes

While the conditions described in section 7.2.3 may have contributed to the effectiveness and experiences of the collaborative mapping process, there were some factors that were raised that could enhance future collaborative mapping processes. These factors address different focus areas and steps of the collaboration process. In terms of drawing in the ‘right’ stakeholders and ensuring their ongoing participation it was suggested that financial incentives could be offered, supporting Ansell et al’s (2020) point that financial realities and considerations play a crucial part in collaborations. However, the extent to which financial incentives play a role in enhancing success of a collaborations was found to be context specific, relying on the expectations of the collaboration team. From the focus group discussion various examples were used to showcase the various expectations in different cities across Africa. In certain cities there is a history of city officials being paid by development agencies or organisations to attend meetings and collaborations, such financial incentives have over time become expected when collaborations are requested with them. However, the expectations by cities who have had very little engagements with development agencies in the past, there are fewer expectations by them to receive financial incentives to participate in collaborations. Furthermore, the introduction of an MOU between state and non-state actors to set out the terms of engagement could also assist with continuity, for defining roles and responsibilities and for obtaining commitment from different departments to release their staff (Booher, 2007; Emerson & Nabatschi, 2015; Head, 2008). However, such an MOU should be co-produced by the participants in the collaboration process rather than imposed on them, going against the very ethos of what collaboration is about (Booher, 2007). Even though collaboration processes tend to be very horizontal in structure, they can still be enhanced by having champions and good leadership (Connelly et al., 2008: 28; Emerson et al., 2011; Mayer & Kenter, 2015: 52). Regarding the former, Agranoff et al. (2012) similarly highlights that the presence of one or more consistent champions with higher levels of authority in a collaboration can enhance the effectiveness and likelihood of success of the collaboration. However, champions can only be effective if they have the support of all participants in the collaborative process. It was suggested that having champions to lead the mapping process and motivate the team would have been beneficial in order to help mainstream the hotspot map into city planning decisions. Other suggestions were quite specific and included having more group working sessions and engagements with city stakeholders in the actual GIS mapping process as well as being aware of the funding organisation’s procurement procedures for bringing in consultants and how they impact the collaboration process. The procurement requirements of an organisation determine who is selected as the consultant. which could result in the selection of a consultant that may not be in line with the city’s choices.

7.3. Possibilities to take the collaboration and hotspot map forward

Various suggestions emerge at the local level from this study. The findings point to a need for further investigation and support on how to capacitate the GIS department within the Lilongwe City Council. More specifically, this includes how to increase the skills and technology available in the department so that maps such as the urban natural assets map can be updated more regularly and effectively.

In terms of keeping the maps up-to-date, more insight into how the city can gain access to funds in order to establish a team that can undergo data collection needed to update the urban natural asset hotspots map. Such monitoring of the ‘on the ground’ situation and changes in relation to the defined areas on the map is essential for the long-term conservation of urban natural assets. In addition, there is a need to review current city planning policies and how the urban natural asset hotspots map can be fed into those policies in order to better inform city planning decisions and practices.

7.4. Final words

In addition to the insight this study provided to ICLEI Africa and the City of Lilongwe with regards to their collaborative mapping approach, this study has contributed to a better understanding of collaborative mapping processes undertaken by institutions or organisations particularly in the urban context in Malawi by showing the various conditions enhancing collaboration, the benefits of maps and the lessons learnt with regards to implementing a collaborative produced urban natural asset hotspots map. More specifically, the study has highlighted that while the actual urban natural asset hotspot map might not be being used to its full extent, the collaboration process was considered to be useful for the stakeholders involved as it opened up conversations and changed the way certain decisions are being made in the Lilongwe City Council, especially in relation to city planning practices. This in and of itself is a noteworthy outcome. In addition, the study findings can function as lessons learnt that can help shape the design of future collaborative mapping engagements as well as how to aid the implementation of an urban natural asset hotspots map in urban planning and development decisions.

8. Appendices

8.1. Guide for semi-structured interviews

Project Title: The role of maps in enhancing collaboration and decision-making processes linked to urban natural assets: A case study of Lilongwe, Malawi

Invitation to participate, and benefits: You are invited to participate in a research study unpacking how a collaborative mapping process of Lilongwe's urban natural assets was undertaken (see Figure one for example image of map below). The study aims to determine how the process of collaborative mapping of urban natural assets might enhance collaborative governance between state and non-state actors in the City of Lilongwe. I believe that your experience would be a valuable source of information, and hope that by participating you may gain useful knowledge.

Procedures: During this study, you will be asked a series of open-ended questions relating to the collaborative mapping of the urban natural assets you were involved in 2017, including how this map has been used in your ongoing work and relations with other departments and non-state actors in Lilongwe. The results of this work and any recommendations will be shared with you through the two ICLEI Africa programmes currently operating in Lilongwe.

Risks: There are no potentially harmful risks related to your participation in this study.

Feedback: You will receive feedback about the results of this research in the following manner: via email upon completion.

Disclaimer/Withdrawal: Your participation is completely voluntary; you may refuse to participate, and you may withdraw at any time without having to state a reason and without any prejudice or penalty against you. Should you choose to withdraw, the researcher commits not to use any of the information you have provided without your signed consent. Note that the researcher may also withdraw you from the study at any time.

Confidentiality: All information collected in this study will be kept private in that you will not be identified by name or by affiliation to an institution. Confidentiality and anonymity will be maintained as pseudonyms will be used.

Recording: We would like to record the interview as part of the study, to help document your response. If you object to this, please let me know.

1. Work

- a) What is your work description and responsibility?
- b) How long have you been working here?

2. The 2017 urban asset mapping process you were involved in, including why and how the mapping activity was started

- a) Can you tell me about the 2017 urban asset mapping process you were involved in, including why and how the mapping activity was started?
- b) Why do you think you were invited to the meeting?

3. The goals of the mapping activity

- a) What do you understand were the goals of the collaborative mapping process?

4. Which institutions/individuals were involved in the urban natural asset mapping activity, and were they 'best placed' to be involved

- a) Why did you join this collaboration?
 - i. What were you able to bring to the collaborative process? || What was your role during the collaboration?
 - ii. What were you hoping to get out of it?
- b) What other sectors and organisations were there and why do you think they were included?
- c) Were there any important sectors or organisations that were not represented at this activity that would help it achieve its intended goals? Why do you think they were not included?

5. Expectations of the urban natural asset mapping activity

- a. What were your expectations of the mapping process?
- b. Do you think these expectations were fulfilled? Why?

6. Your attendance and inputs during the collaborative urban natural asset mapping process

- a) Out of the 3 engagements/workshops, how many of the engagements/ workshops were you able to attend?
- b) Did you have any guidance, before or at the beginning of the workshop, prior to the mapping activity?
 - i. If so, in what way were you guided?
- c) Were you able to provide input and share your perspective during the mapping activity?
 - i. If so, what was your contribution and how were you enabled to share?
 - ii. If not? why?

7. What did and did not work well during the urban natural asset mapping process

- a) What do you think worked well during the mapping process?
- b) What do you think could have been done differently (if at all) to:
 - i. improve the process?
 - ii. ensure continued collaboration?

8. Learnings from the urban natural asset mapping collaboration

- a) What did you learn from the collaborative process?

- i. Have you been able to apply any of this learning? - if so, what and how was this enabled?
- ii. What did you share with your colleagues back at the office?

9. Use of the urban natural asset maps

- a) Have you or your work colleagues used the collaboratively produced urban natural asset maps to inform urban planning or other activities?
 - i. If so, how?
 - ii. If not, why?
- b) Do you know if the collaboratively produced urban natural asset maps have been used by others in Lilongwe?
 - i. If so, do you know by who and how?
 - ii. If not, do you know why that may be?

10. Collaboration since the production the urban natural asset maps

- a) Have you been in contact with the participants since the collaborative process?
 - i. If so, why & who?
 - ii. If not, why not?
- b) Do you think the collaboratively produced urban natural asset maps has enabled further collaboration between key stakeholders in Lilongwe City?
 - i. If so, how?
 - ii. If not, why?

8.2 Consent form for interview participants

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Informed Voluntary Consent to Participate in Research Study

Project Title: The role of maps in enhancing collaboration and decision-making processes around urban natural assets: A case study of Lilongwe, Malawi

Invitation to participate, and benefits: You are invited to participate in a research study conducted with selected state and non-state actors involved in the mapping of Lilongwe's urban natural assets. The study aim is to determine how the process of collaborative mapping of urban natural assets can enhance cross-sector collaborative governance between state and non-state actors in the City of Lilongwe. I believe that your experience would be a valuable source of information, and hope that by participating you may gain useful knowledge.

Procedures: During this study, you will be asked a series of open-ended questions relating to the collaborative mapping of the urban natural assets you were involved in 2017, including how this map has been used in your ongoing work and relations with other departments and non-state actors in Lilongwe. The results of this work and any recommendations will be shared with you through the two ICLEI programmes currently operating in Lilongwe.

Recording: We may record audio as part of the study. If you object to this, please indicate this below.

Risks: There are no potentially harmful risks related to your participation in this study.

Feedback: You will receive feedback about the results of this research in the following manner: via email upon completion.

Disclaimer/Withdrawal: Your participation is completely voluntary; you may refuse to participate, and you may withdraw at any time without having to state a reason and without any prejudice or penalty against you. Should you choose to withdraw, the researcher commits not to use any of the information you have provided without your signed consent. Note that the researcher may also withdraw you from the study at any time.

Confidentiality: All information collected in this study will be kept private in that you will not be identified by name or by affiliation to an institution. Confidentiality and anonymity will be maintained as pseudonyms will be used.

What signing this form means: By signing this consent form, you agree to participate in this research study. The aim, procedures to be used, as well as the potential risks and benefits of your participation have been explained verbally to you in detail, using this form. Refusal to participate in or withdrawal from this study at any time will have no effect on you in any way. You are free to contact me, to ask questions or request further information, at any time during this research.

I agree to participate in this research (tick one box) Yes No _____ (Initials)

I agree to be audio-recorded Yes No _____ (Initials)

I agree to the use of properly anonymized audio recordings in the following way – for data collection and transcription Yes No _____ (Initials)

Name of Participant

Signature of Participant

Date

Name of Researcher

Signature of Researcher

Date

8.3 Guide for focus group

Through the UNA programme, the collaborative mapping of urban natural asset hotspots in the city of Lilongwe was considered to be both a useful and beneficial process. However, from the interview findings, such collaborative mapping processes could be made more effective. In addition, participants noted a number of reasons as to why the urban natural asset map are not being used to city planning and development in Lilongwe City.

Participants perceptions on how collaborative mapping processes can be made more effective in the future in multiple contexts are outlined in Table 1 below:

Theme	Quote	Participant
More group working sessions	<i>"We did not have a lot of working sessions...I think it would have been helpful if we had more working sessions."</i>	Participant 5
	<i>"I mean I think I would have liked to have more direct engagement with the city council. I kind of felt like we got on with it a bit"</i>	Participant 6
Incentives & funding	<i>"...a lot of times people are so busy and so resource limited that it's like 'another person wants to have a meeting with me', 'why am I going to this?', 'what's the point?'. Unless you've got something that's going to benefit – you will arrange meetings and people just don't turn up."</i>	Participant 6
	<i>"...quite often, to be brutally honest, it's hard to get people to engage with you when there is no money involved. "</i>	Participant 6
Having an Memorandum of understanding	<i>"signing an MoU with the city in that the things that came out of this process have to be taken forward and that's the only reason we are going to support this process so that discussions were actually in their KPI/KPAs, so that they did them because that's the only way I can see... I mean they had us all at their fingertips and yet nothing was taken forward. And that's the question for me that's so interesting about your research topic is that "why"- why didn't that happen, what could ICLEI do better allow for the institutionalization of these processes and outputs that we've been so strongly supporting. And so, I think probably more research into that and maybe and MoU/ KPI/KPA would mean that they have to do it and that probably links back to the city's budget, so that they have that ownership"</i>	Participant 7
Procurement procedure	<i>"one is the procurement, I think if ICLEI had the policy where we could give the city council the money and then they follow their procurement and ran the whole process with us supporting, it might have helped because they might have</i>	Participant 7

	<i>had a better sense of ownership, but at the same time that risk is massive because probably nothing would have been done and they would have taken that money. So that's a potential that we could have created better ownership processes for the city"</i>	
Having a champion	<i>"stick to one focal point so that that's the person that is responsible for running the process. I would take risk management of that high turnover, because I mean we lost 3 key individuals in the process that I think would have made change with institutionalizing the map. I don't know, we didn't have the head of planning – they came to the first ever meeting, and then he didn't come again. So maybe I should have pushed harder there, but I tried my best and he just never came."</i>	Participant 7

Question for focus group: Can you reflect on each these themes, starting from the first theme and making our way through to the last theme?

Participants response/ perception on why the urban natural asset map are not being used to city planning and development in Lilongwe City are listed in the Table 2 below.

Theme	Quote	Participant
Outdated laws & regulations	<i>"It can be a policy issue because, like in the town planning act you're definitely not going to find this because it is an old document. You aren't going to find where they refer to using of such maps. When there is an opportunity for review then these tools [the maps] can be mentioned in there. You cannot embrace the map without knowing how it is going to affect your [legal process]. So, it's like still, when it comes to policies and overarching legislation there is that challenge...you cannot just embrace it without knowing how it is going to affect. you feel that I must be careful to remain traditional so to say, traditional methods we are used to and that are acceptable."</i>	Participant 3
Politics of enforcing laws & regulations	<i>"the regulations, the laws, the provisions – they are there to enable us to do the enforcement. The people might be there. But you will find that they cannot enforce. The moment you start enforcing it becomes political. So, it's largely political. Then because of that, issues of corruption creep in" ... "when it turns political you are there to suffer as an individual. You are there doing your job, but somebody sees it as if it's your...personal opinion."</i>	Participant 1
lack of capacity, in terms of skills, appropriate tools & equipment	<i>"There is now a lack of appropriate tools and equipment you know – things like for you to enforce you must be very mobile... [but there are] no vehicles. For you to enforce you must have the backing of the upper so that when you apprehend somebody or something at least somebody will...but you will be there fighting as if it's your personal...you know"</i>	Participant 1

	<i>“...basically, it is because of lack of expertise in employing” ... “that expertise is yet to be there because our GIS department is not well trained, so to say, so they are not really supporting us.”</i>	Participant 3
	<i>“there is a GIS unit, but it is not very functional. We don’t have equipment...and the human resources educated to pursue the GIS unit”</i>	Participant 4
City does not have ownership of land	<i>“...the Lilongwe city council, as a local authority, is given this mandate to do development control after the plans have been prepared.”</i>	Participant 1
	<i>“because the land does not belong to us, they also go and intimidate the people who are responsible for issuing land hey. They will just come to you as an officer and say ‘I want this place’ and they are not expecting a no from you. You cannot say ‘ah but that area is reserved for ecological...’ they want it.”</i>	Participant 1
Limited funding	<i>“the problem is funding you see”</i>	Participant 2

Question for focus group: Can you reflect on each these themes, starting from the first theme and making our way through to the last theme?

8.4. Consent form for focus group participants

DEPARTMENT OF ENVIRONMENTAL AND GEOGRAPHICAL SCIENCE

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Informed Voluntary Consent to Participate in Research Study

Project Title: The role of maps in enhancing collaboration and decision-making processes around urban natural assets: A case study of Lilongwe, Malawi

Invitation to participate, and benefits: You are invited to participate in a research study conducted with the Urban Natural Asset: Rivers for life project team in relation to the collaborative mapping of Lilongwe's urban natural asset hotspots. The study aim is to determine how the process of collaborative mapping of urban natural assets can enhance collaborative governance between state and non-state actors in the City of Lilongwe. I believe that your experience would be a valuable source of information, and hope that by participating you may gain useful knowledge.

Procedures: Over the last few months, selected participants involved in the 2017 collaborative mapping of urban natural asset hotspots in Lilongwe, were interviewed. During these interviews participants were asked a series of open-ended questions relating to the collaborative mapping of the urban natural assets undertaken as well as how this map has been used in your ongoing work and relations with other departments and non-state actors in Lilongwe group discussion be asked a series of questions relating to the collaborative mapping of the urban natural assets. Following on from this, during this focus group discussion you will be presented with interview participants perceptions on how such collaborative mapping process could be made more effective in the future. The results of this work and any recommendations will be shared with you through the two ICLEI programmes currently operating in Lilongwe.

Recording: We may record audio as part of the study. If you object to this, please indicate this below.

Risks: There are no potentially harmful risks related to your participation in this study.

Feedback: You will receive feedback about the results of this research in the following manner: via email upon completion.

Disclaimer/Withdrawal: Your participation is completely voluntary; you may refuse to participate, and you may withdraw at any time without having to state a reason and without any prejudice or penalty against you. Should you choose to withdraw, the researcher commits not to use any of the information you have provided without your signed consent. Note that the researcher may also withdraw you from the study at any time.

Confidentiality: All information collected in this study will be kept private in that you will not be identified by name or by affiliation to an institution. Confidentiality and anonymity will be maintained as pseudonyms will be used.

What signing this form means: By signing this consent form, you agree to participate in this research study. The aim, procedures to be used, as well as the potential risks and benefits of your participation have been explained verbally to you in detail, using this form. Refusal to participate in or withdrawal from this study at any time will have no effect on you in any way. You are free to contact me, to ask questions or request further information, at any time during this research.

I agree to participate in this research (tick one box) Yes No _____ (Initials)
I agree to be audio-recorded Yes No _____ (Initials)
I agree to the use of properly anonymized audio recordings in the following way – for data collection and transcription Yes No _____ (Initials)

_____	_____	_____
Name of Participant	Signature of Participant	Date
_____	_____	_____
Name of Researcher	Signature of Researcher	Date

8.5 Research permission to undertake research in Malawi



NATIONAL COMMISSION FOR SCIENCE & TECHNOLOGY

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NATIONAL COMMITTEE ON RESEARCH IN THE SOCIAL SCIENCES AND HUMANITIES

REF NO. NCST/RTT/2/6

Engineer Dr Burnet Mkandawire
The Polytechnic
P/Bag 303
Chichiri
Blantyre 3

1st October, 2018

Email address: bnkandawire@poly.ac.mw

Dear Engineer Dr B Mkandawire,

RESEARCH ETHICS AND REGULATORY APPROVAL AND PERMIT FOR PROTOCOL NO. P.04/18/263: IMPROVED MUNICIPAL PLANNING IN AFRICAN CITIES-IMPACT-FOR A CLIMATE RESILIENT URBAN FUTURE

Having satisfied all the relevant ethical and regulatory requirements, I am pleased to inform you that the above referred research protocol has officially been approved. You are now permitted to proceed with its implementation. Should there be any amendments to the approved protocol in the course of implementing it, you shall be required to seek approval of such amendments before implementation of the same.

This approval is valid for one year from the date of issuance of this approval. If the study goes beyond one year, an annual approval for continuation shall be required to be sought from the National Committee on Research Ethics in the Social Sciences and Humanities (NCRSH) in a format that is available at the Secretariat. Once the study is finalised, you are required to furnish

NCRSH Address:

Secretariat, National Committee on Research in the Social Sciences and Humanities, National Commission for Science and Technology, Lingadzi House, City Centre, P/Bag B303, Capital City, Lilongwe3, Malawi. Telephone Nos: +265 771 550/774 869; E-mail address: ncrsh@ncst.mw

the Committee and the Commission with a final report of the study. The committee reserves the right to carry out compliance inspection of this approved protocol at any time as may be deemed by it. As such, you are expected to properly maintain all study documents including consent forms.

Wishing you a successful implementation of your study.

Yours Sincerely,



Mike Kachedwa
HEAD OF NCRSH SECRETARIAT
For: CHAIRMAN OF NCRSH

NCRSH Address:

Secretariat, National Committee on Research in the Social Sciences and Humanities, National Commission for Science and Technology, Lingadzi House, City Centre, P/Bag B303, Capital City, Lilongwe3, Malawi. Telephone Nos: +265 771 550/774 869; E-mail address: ncrsh@ncst.mw

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