COOPERATION OF ACTORS IN MAINTENANCE OF URBAN GREEN SYSTEMS IN DAR ES SALAAM CITY:

The case of Mbweni, Kijichi and Buyuni

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ABSTRACT

Context and background

Urban green systems in the global south are depleting at an alarming rate and placing the resilience of cities in question. This paper examines how the cooperation of actors in urban green systems influences their maintenance in Dar es Salaam City.

Goal and Objectives:

This paper aims to examine how actors cooperate in the maintenance of urban green systems in Dar es Salaam City.

Methodology:

Dar es Salaam City was used as a case study. Qualitative data were collected through Focus group Discussions, consultation with street leaders, and in-depth interviews with national level government agencies, municipal level authorities and community level actors and conservation groups.

Results:

This study found that whilst the diverse actors desire to cooperate towards the maintenance of urban green systems such efforts are bedeviled by inadequate resource mobilization including financial and human resource necessary for promoting green systems. Urban green systems maintenance efforts were affected also by overlapping roles of government actors. Activities for maintenance of urban green systems in Municipal councils of Kinondoni and Temeke received 40million Tshs (17,160$) and 23million Tshs (9,867$) respectively less funds than annual budget requested. The study recommends that various roles undertaken by different actors need to be coordinated so as to enhance cooperation of actors in maintaining urban green systems.

Keywords:

Actors, attitudes, behavior, urban green systems, Dar es Salaam City

1. INTRODUCTION

Green systems play a significant role in building the resilience of cities. However, urban green systems in cities of the global south are disappearing at unprecedented rate (Guarnat et al., 2021; Girma et al., 2019; Karutz et al., 2019; Mensah et al., 2017). Dar es Salaam city is among the cities which has experienced significant loss of its green systems (Karutz et al., 2019). The Green City Index ranks Dar es Salaam as 10m² below the average of 74m² for larger African cities. The city has only 2% of its area under green spaces (World Bank, 2019). The loss of green systems such as vegetation cover is exacerbated by the demand for ecosystem services by the nearby community and inadequate support for their maintenance by the actors. Mensah et al. (2017) found that the disappearance of urban green systems was linked to inadequate cooperation of actors and insufficient promotion of activities required for maintaining green system by urban planning authorities. Urban green systems present areas in urban settings connecting water and vegetation which may be composed of the semi-natural or natural environment.

The cooperation of actors for maintenance of urban green systems has received emphasis internationally and regionally (UN-Habitat, 2018; Dasse et al., 2018; Milner, 1992). The foci of the emphasis among others include the integration of urban green systems with land use development and ecosystem services provisioning (UN-Habitat, 2018). The cooperation of actors for example in the European countries demonstrates to encourage and uplift the efforts of various actors to maintain urban green systems to enhance resilience (Barau et al., 2019; Valencial et al., 2019). The encouragement is a result of integrated actions in the maintenance of green systems (Buijs et al., 2016; van der Jatg et al., 2017). Further, cooperation of actors is linked with the willingness (attitude), and actions (behavior) of actors to meet certain goals (Gulati et al., 2012; Castañer and Oliveira, 2020). Both, willingness and actions are related to the attitude and behavior of the actors.

Actions implemented to protect green systems including patrol, tree planting programs, financial support and cleanness of the surrounding environment increase the sustainability of the systems (Buizer et al., 2015; van der Jagt et al., 2017). Access to resources by actors and the capacity to mobilize them is important for urban green ecosystem maintenance (McCarthy et al., 2002; Roberts, 2003). Access to resources for urban green ecosystem maintenance enhances the cooperation of actors (Buijs et al., 2016; Buizer et al., 2015; McWilliam et al., 2015). Meetings and sharing of information on the conservation or protection of green systems can enhance the cooperation of actors (European Commission, 2015). The meetings provide the platform for information sharing between the actors (Ferreira et al., (2020). Evidence from the literature demonstrates that lack of well-organized effective mechanisms to engage actors from different institutions and those at the community level have negatively affected actor's cooperation to promote green systems in the global south (Linuma and Tang'are, 2018; Mensah et al., 2017; Mkhai et al., 2018; USAID, 2019). Further, policies, laws and institutional structures may incentivize or dis incentivize actor's cooperation in maintenance of green systems (Acreman et al., 2021; Alam and Lovett 2019; Mahjabeen et al., 2009; Guenat et al., 2021; Girma et al., 2019; Ikawa, 2015; Ekong, 2017; Mensah et al., 2017). This paper analyses the cooperation of actors in maintenance of urban green systems in Dar es Salaam City. It attempts to answer research questions on the division of actors' roles and actions in maintenance of urban green systems and the factors which enhance or weaken cooperation.

The findings of this study would offer input to the cooperation concept on the maintenance of urban green systems and natural resources as a whole. On the other hand, enlightens the policy- makers in understanding the contribution of cooperation and formulating effective mechanisms to increase

cooperation among institutions and actors in enhancing the sustainability of cities in the global south and Tanzania.

3. METHODOLOGY

3.1 Description of the study area

This study was conducted in Dar es Salaam City, Tanzania. The city is located between latitude 6o45" S and 7o25" S and longitude 39o E and 39o55" E (Todd et al., 2019). Mbweni Buyuni and Kijichi ward were selected to analyze the capacity of actors to cooperate. The reason for selecting these wards is that Buyuni is nearby Kazimzumbwi forests, which form the catchment area connecting Mbweni and Kijichi green systems through Mpiji and Kizinga rivers. Kazimzumbwi covers 4887ha and has important biological diversity. As a result, it is one of the 25 global biodiversity hotspots. It is inhabited by endemic species that support 37 animal and plant species and about 554 endemic plants (Mngumi, 2021; World Wide Fund, 2019). In addition, the mangrove forests found in Kijichi and Mbweni are essential ecological and socio-coastal systems that protect the coast from erosion (Mabula et al., 2017; Samoilys et al., 2013).
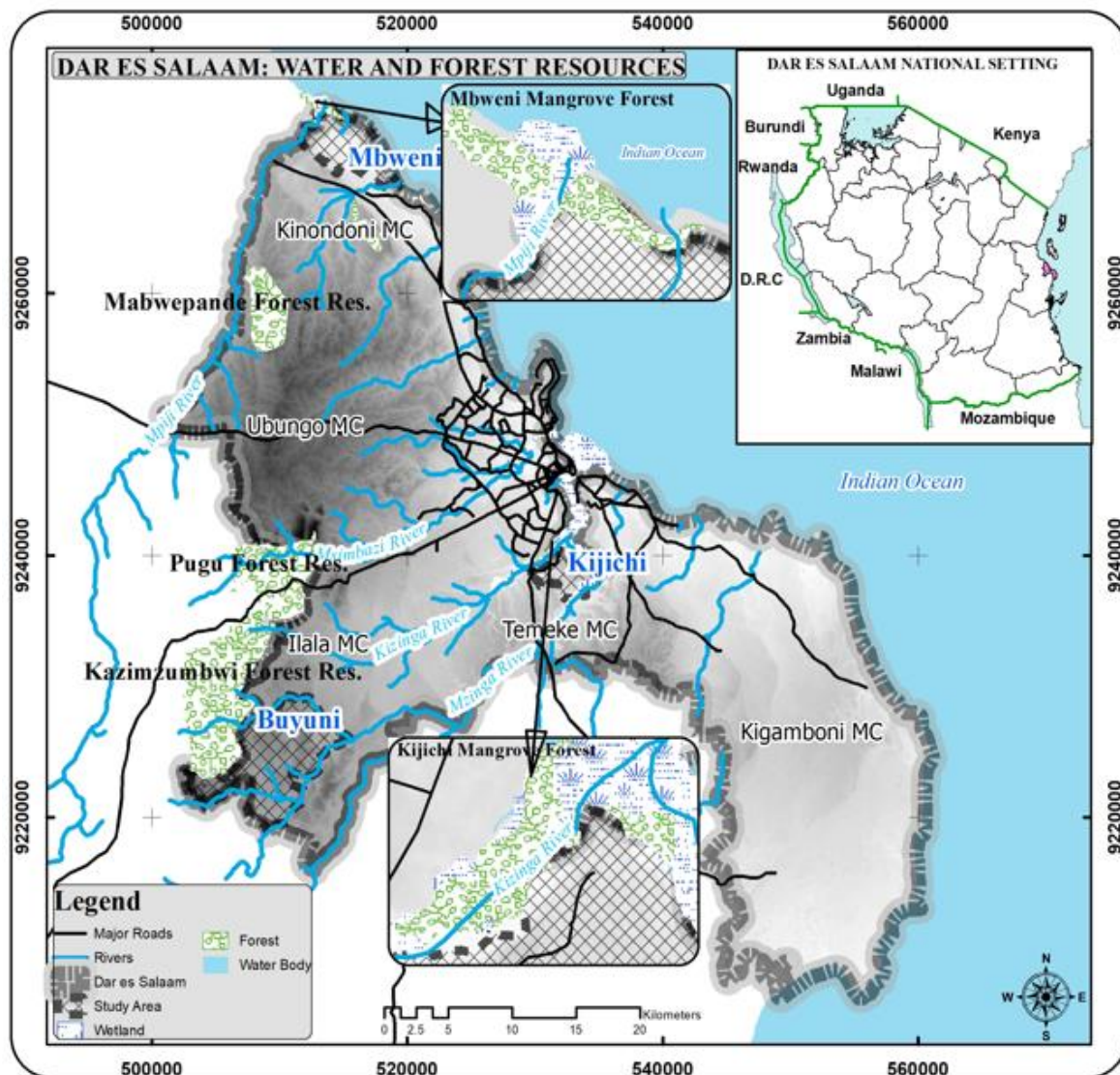

Figure 1: Location of the study area

3. 2 Materials and methods

The study adopted a case study design. Qualitative data were collected through in-depth interviews with key informants, Focus Group Discussions (FGDs), and consultation with the local leaders. In-depth interviews covered key informants from two national-level agencies (NEMC & TFS), three municipal-level agencies (Kinondoni, Ilala and Temeke) and community (Street leaders) and conservation groups. Six FGDs, two from each case study were conducted with conservation groups and selected members of the community. The FGDs included 6 to 11 participants mixed between men and women except for one FGD with a conservation group which was composed by women only.

The collected data were recorded using a smartphone recorder. Collected data included the activities on maintenance of the studied urban green systems, cooperation of actors, actors' roles in maintenance activities, financial and human resource availability and participant quotes during the discussion and consultation process. Excel version 2013 was used to produce tables and figures.

4.0 Results

4.1 Maintenance of urban green systems

The maintenance of urban green systems is associated with the preservation, management, and conservation of green systems to minimize the adverse effects and improve their long term sustainability (Arvanitidis, 2008). The maintenance activities which are conducted for the case study green systems included patrolling, planting trees, cleanness of the surrounding environment, installation of sign boards and beacons along the green system boundaries to prohibit unsustainable human activities. Some of the green system friendly activities such as fishery and beekeeping were permitted based on agreed guidelines and procedures by the actors of the urban green systems. The activities are important for enhancing urban green systems. However, they require coordination of the actors and resources in order to promote green systems.

The actors undertake different activities toward maintenance of urban green systems. Identified actors were the national level government agencies (TFS, NEMC); the municipal level authorities (Natural resource officers, Town Planners and Urban Planning Committees) and last group is community and conservation groups. The national level government agencies are responsible for patrolling, rehabilitation and installation of sign boards, friendly activities and installation of beacons. The municipal level authorities are responsible for rehabilitation, patrolling and promotion of friendly activities. Community level and conservation groups are responsible for rehabilitation including planting trees, patrolling, cleanness of the surrounding environment and sustainable use of the goods and services from the green ecosystems. The study revealed that these institutions interact in the maintenance of urban green systems with diverse goals.

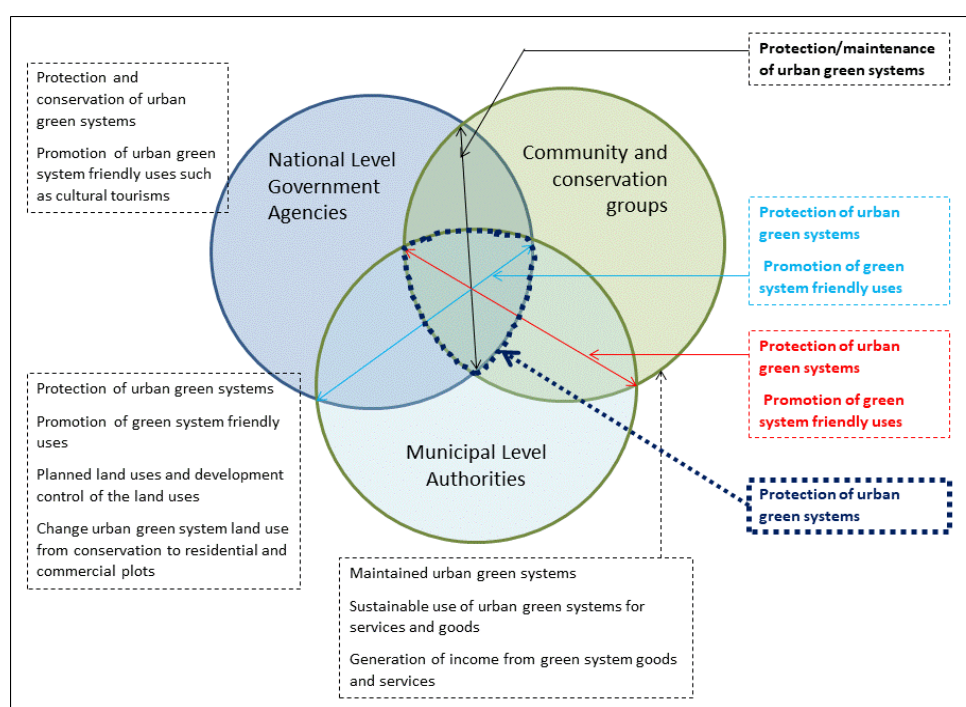## 4. 2 Actors' goal in the maintenance of urban green systems

The actors for urban green ecosystems have different goals. While some of their goals were divergent, some of the actor's goals were similar (Table 1). Enhancing the protection of urban green systems and promotion of sustainable use of green system services and goods were similar between the national level government agencies and municipal level authorities. Divergent goals occurred when the municipal authorities were more interested to change land use under the urban green system from conservation residential and commercial plots. Community and conservation groups' goals were similar with those of the national level government agencies aiming on maintenance and community's engagement in sustainable use of the ecosystem services. However, unregulated access to ecosystem services diverges from protection and conservation goals making enforcement of the

mechanism and procedures for extraction of services and goods paramount. Divergent goals therefore are disincentive to the maintenance of urban green systems because actors have the tendency prioritize their goals at the expense of ecosystem conservation and protection goals.

Institutions (actors)	Goal on maintenance of urban green systems
National level government agencies	Enhancing protection and promotion of urban green system friendly uses such as cultural tourism
Municipal level authorities	
Natural resource department	Enhance protection and promotion of green system friendly uses
Urban Planning department	Enhance plan for different land uses and control development of land uses and change urban green system land use from conservation to residential and commercial plots
Community and conservation groups	Enhance maintained urban green systems and sustainable use of urban green systems for services and goods Generation of income from green system goods and services

Table 1: Urban green system maintenance goal among actors (Source: Field data, 2019)

In spite of some of the divergent goals between the actors, the protection or maintenance of urban green system was common to all the three categories of actors (Figure 2). Actors' goals were driven by their institutional objectives and plans. Community and conservation groups were more inclined to participation in ecosystem maintenance activities and considered support of their planned maintenance activities through conservation and protection projects important. They considered access to urban green systems services, goods, and employment as one of their expected benefits. However, no support could be identified at the time of data collection for this study. Urban green system-friendly projects can reduce direct community's dependence on green systems for their livelihoods thereby positively contributing to the sustainability of the green systems.

Figure 2: Actors' goals in the maintenance of urban green systems

4.3 Cooperation of actors in maintaining urban green systems

Attitudes

The cooperation of actors on green system maintenance depends on their attitudes, behavior and the outcomes of the action subject for cooperation (Castañer and Oliveira, 2020). The actors for urban green systems in Dar es Salaam city demonstrated their attitude to cooperate (Table 2). The national level government agencies for example reported to have included issues of urban green systems in the Forest Policy, 1998, Forest Act, 2002, Urban Planning Act, 2007, allocated funds for maintaining urban green systems and already had integrated patrol and rehabilitation of the green systems in their routine maintenance activities. The municipal level authorities also have integrated urban green systems in the planning schemes such as zoning of different land uses including urban green systems where 2019.6Ha and 1600.5Ha in Temeke and Ilala respectively are set aside for conserved activities. Municipal level authorities revealed to integrate rehabilitation and patrol of the green systems in the routine maintenance activities. Community and conservation groups devoted time in maintaining urban green systems. Although various institutions were willing to maintain urban green systems, their willingness depends on their behavior and cooperation in maintaining green systems.

Actors' behavior

National-level agencies undertake various roles and actions to maintain urban green systems. The main actions done by national government agencies are realizing funds for maintaining urban green systems, formulation and enforcement of policies and laws, maintaining urban green systems through patrolling, rehabilitation through planting and replanting trees. Other activities supposed to undertake include capacity building, establishing cultural tourism. However, activities like establishment of cultural tourism and capacity building were not fulfilled because of limited funds to facilitate them (Figure 3). The activities for national government level agencies are also indicated in the Forest Act No 14 of 2002 section 5 and the Tanzania Environmental Management Act, No 20 of 2004 section 18.

Municipal level responsibilities for urban green systems were identified to include designating and protecting urban green systems from encroachment, patrolling, working with stakeholders to support the preservation of green systems (planting and replanting trees), and training communities on maintenance of urban green systems. They enforce laws such as forest laws, environmental laws and policies to ensure that green systems are maintained. In addition, institutions like the department of urban planning carry out the zoning of different land uses such as green spaces, and urban forests and enforcement of different land uses including urban green systems to overcome encroachment as explained in the Urban Planning Act, 2007 section 28, and Local Government Act, 1982 section 59 (see Table 2). However, the findings revealed weak enforcement on land use development and control, resulting in encroachment of the conserved areas, including green systems. Limited financial and human resources contributed to weak enforcement of land use development control (Table 3). Furthermore, not all actors commit to supporting the maintenance of urban green systems because of poor cooperation. Poor cooperation especially between natural resource and town planner officers because town planners from the department of urban planning are interested to convert forests into residential and commercial plots while natural resource officers need to protect the green systems.

Community and conservation groups undertake several activities to promote urban green systems including planting trees, patrolling and cleaning the surrounding environment. According to the

Forest Act, 2002 section 11 the communities neighbouring green systems can engage green systems friendly activities such as beekeeping. However, communities in all studied green systems claimed that were not engaged in beekeeping. In Buyuni, the conservation groups claimed that nowadays not engaged in planting trees since 2018 because the nearby green system is protected by the national level agencies (TFS). Having no genuine activities or projects to engage communities can influence negatively their willingness to promote the urban green systems.

Institution	Attitudes	Behavior	Outcome	Observation
National government level agencies	Maintenance of Urban green systems included in plans and policies (Tanzania Forest Policy, 1998; Forest Act, 2002	Policies and laws to support green systems are enforced, Maintained 378.4ha, 107.3ha, and 25.3ha of green systems in Kijichi, Mbweni, and Ilala respectively	Policies are enforced	Laws are enforced
			The designated areas are maintained	The areas covered by the green system were observed
		Capacity building was incorporated into the policies and is supposed to be conducted (Forest Act, 2002 sec 5&6); Beekeeping Act, 2004	No capacity building was done to the communities included in the study	No capacity building to neighboring communities was revealed in FGDs and in-depth interviews
	Urban green Systems allocated budget	Released funds for urban green systems maintenance activities	Finds were released	Revealed from TFS and municipal council documents
	Rehabilitation incorporated in the strategic plan (2014-2019)	Rehabilitation of the forest (planting & replanting of trees see plates 1 and 2),	Improved ecosystems (vegetation cover)	Trees planted and observed (Plate 1)
		Engaged in patrolling to overcome encroachments	This was done	Patrolling was done occasionally
Municipal level authorities	Rehabilitation is incorporated into the policies and enforced in the laws (Forest Act, 2002; Forest Policy, 1998; Environmental Management Act, 2004)	Enforcement of the laws (Forest Act, 2002; Forest Policy, 1998; Environmental Management Act, 2004) Planting trees and patrolling	Rehabilitation through planting trees Patrolling	Occasionally
		Work with stakeholders to promote green systems such as conservation groups in the rehabilitation of the green system	Planting trees in Mbweni was done	Rehabilitation was done occasionally with communities, No training was carried out in

	Urban green systems maintenance is integrated into land use plans and urban schemes like master plans (Dar es Salaam master plan 1979 and the master plan of 2016)	Enforcement of various land uses i.e zoning of different land uses including urban green spaces and forests (the Urban Planning Act, 2007 No.8 section 28 and the Local Government Act, 1982 section 59)	Master plan of Dar es Salaam was produced in 2016 Green systems were zoned such as conserved urban forest	Mbweni, Kijichi and Buyuni; Green systems were encroached On because of limited resource personnel and funds to enhance development control. Limited resources do not match with urban expansion rate
Community and conservation groups	Integrated rehabilitation, patrolling in their routine activities	Devoted time to rehabilitate urban green systems through planting and replanting of trees (Plate 1); cleanness of the surrounding environment, patrolling; adhering to the regulations; (Forest Act, 2002 section 3; Environmental Management Act, 2004 section 11)	Planted and replaced degraded areas	Improved ecosystems especially the vegetation cover
	Seeking for maintenance project	No action	No project in place	No project was established to support their goals

Table 2: Responsibility of actors in urban green systems reflecting main categories of cooperation

Outcome and observation

The actors highlighted during the consultation that the vegetation cover of the urban green system in the study areas are improving as result of the actors support for the restoration of the green systems (Plate 1 and 2), routine patrols and installation of warning signs. Despite the initiative taken by the actors some of the activities including capacity building among communities surrounding the green systems were not implemented because of inadequate funds. In addition, some individuals from community level continued degrading the green systems as they used non-recommended fishing gear and some engaged in collection of firewood. Illegal activities occur due to limited resources including human resources affecting daily monitoring and routine patrolling (Table 3). The planning of different land uses has been low compared to the urban expansion leading to the encroachment of the green systems. In addition, limited fund was revealed to influence promotion of

non-destructive investments such as beekeeping and cultural tourism as none of project was found in the studied urban green systems.

Plate1: Mbweni planted trees by conservation groups

(Source: Field data, 2019)

Plate 2: Planted mangrove trees by TFS

(Source: TFS office, 2019).

4.4 Resource mobilization

4.4.1 Budget allocation for urban green systems

Figure 3 demonstrated that the budget for maintenance of urban green systems increased in 2017/18 and 2019/20 from 103.6Tshs million to 258.5 Tshs million. Likewise, the budget provided in 2017/18 and 2019/20 increased from 52.6Tshs million to 150.5Tshs million. The increase in budget allocation and flow of funds suggests a recognition of the authorities on maintenance of urban green systems. Also, it shows that demand for maintenance of green systems increased because of the need to restore the ecosystem services to continue supporting the provision of ecosystem services and ecological systems. The budget deficit was also increasing proportionally by 30Tshs million. Such proportional increase depended on the money requested and what was provided to support urban green systems (figure 3). In the interviews one of the key informants said that the budget provided was not enough for rehabilitation such as planting trees, patrolling, and facilitating non-destructive projects such as beekeeping and cultural tourism. This was because the budget provided was to cover all green systems in Kinondoni, Ilala, and Temeke. The remaining part of the budget which was not paid affected the establishment of non-investment activities and other items required for supporting maintenance such as working facilities.
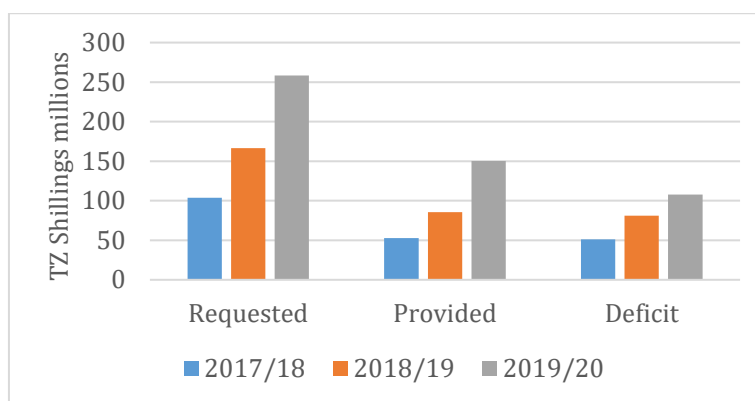
Figure 3: Budget for supporting maintenance activities (Source municipal and TFS offices)

4.4.2 Shortage of natural resource and town planning officers

All the Municipal Authorities have inadequate staff in the fields of natural resources and town planners as compared to required staffing levels (Table 3). Since the available staffs are already overwhelmed with the municipal wide responsibilities for forest and urban planning and management, enforcement activities to maintain specific urban green systems including the three under this study cannot be effectively implemented. As a result regular site visits to enhance patrol of the green systems and enforce development control of the areas surrounding the systems are negatively affected.

Table 3: Available versus required number of natural resource officers and town planners for Dar es Salaam Municipal Authorities

Resource Personnel		Temeke	Kinondoni	Ilala
Natural Resource Officers	Available	9	1	1
	Needed	15	23	12
	Deficit	6	22	11
Town Planners	Available	5	5	7
	Needed	12	13	13
	Deficit	7	8	6

Source: Field data from municipal council offices, 2021

4.4.3 Working gears for maintenance activities of urban green systems

The working gears required for maintenance activities of the green systems including cars for transport, gumboots, raincoats, helmet and gloves were being inadequately provided to community members. Lack or shortage of the gears was a disincentive to make restricted patrols and regular visits to enforce protection of the green systems as per quote below:

"Our main task is to make sure green systems are not infringed on by conducting a routine patrol, but we sometimes fail to go to the field because the cars are not enough sometimes you can request to be provided with the car, but you can be told that another officer uses it."

One member of a conservation group from Mbweni informed the researcher during the consultation that they had not been supported with working tools which negatively affected enforcement for protection and conservation activities by the communities and conservation groups. One of the representatives for the TFS informed the researcher during the consultation that TFS normally provides funding to the responsible ministry to purchase working tools necessary for maintenance

of the green systems. However, required equipment may delay reaching the users at the community level because of the procedures needed to be followed.

5. DISCUSSIONS

The study has examined actors' cooperation in maintaining urban green systems in Dar es Salaam City. The cooperation of actors is of significant contribution to the maintenance of urban green systems (Green et al., 2016; Nikolaidou et al., 2016). The findings of this study illustrate that actors at different levels are willing to cooperate in promoting and maintaining urban green systems. However, cooperation of actors has been influenced by overlapping goals and roles on urban green systems between government actors, for example, the municipal level authorities and national government level agencies (Table 1). These findings align with Mensah et al. (2017) and Ekong (2017) who found out that the maintenance of urban green systems is negatively affected by actors from government institutions operating at different scales with divergent goals for example, national government level agencies' goals is to protect the green systems and promote investment while the municipal level authorities including the department of urban planning their main goal is to plan for different land uses and provide commercial and residential plots and control development of different land uses. This affects cooperation as each gives attention to the assigned roles to meet the goals of their institutions.

The cooperation of actors play a key role in supporting activities related to urban green systems (van der Jatg et al., 2017). The roles of actors are in line with the existing policies and regulations (Table 2). In this view, each actor from various institutions adhered to the policies and laws as indicated in Table 2, which support certain interests of particular sectors. These policies and laws are not coordinated to enable different institutions to cooperate in their activities towards enhancing greening of the city. Cooperation of actors is emphasized in the Sustainable Development Goal, especially goal 11. However, inadequate coordination of activities affects cooperation and hence difficult to attain SDG 11. On the other hand, the SDG advocates that state countries establish policies that consider the cooperation and greening of cities (UN-Habitat, 2018; Dasse et al., 2018). The implementation of policies and laws concerning greening of cities can be affected by uncoordinated activities as said earlier that each institution tends to implement laws following the institution's assigned activities to meet their goals. This is commonly reflected in many other countries in the global south like Malawi, Ethiopia, Ghana, where experience show that policies and laws are implemented based on the specific sector (Guenat et al., 2021; Girma et al., 2019; Mensah et al., 2017). As a result, they influence the maintenance of urban green systems.

Effective cooperation of actors in maintaining urban green systems is affected by deficit resources necessary for promoting urban green systems (Colding et al., 2020; Buijs et al., 2016; Buizer et al., 2015). In European cities, for example, it is reported that inadequate financial support and human resource hampered cooperation in the promotion of green system. Likewise, the findings of this study demonstrated that limited funds have influenced the implementation of some activities required to promote cooperation of actors to support urban green systems. Results (Table 2) indicated that some activities related to maintenance of green systems were not fulfilled by responsible actors such as the capacity building to the neighbouring communities, and the establishment of maintenance projects. Financial constraints towards the maintenance of urban green systems was the factor behind the problem of providing adequate working facilities which affected regularly follow-up and ensure green systems is not degraded.

6. CONCLUSIONS

The study has demonstrated the way actors' cooperate in the maintenance of urban green systems in selected green systems of Dar es Salaam City. The cooperation of actors constitutes three major aspects that are attitudes, behavior and outcomes. The three aspects are the willingness of actors to promote urban green systems, the activities done to support urban green systems and the outcomes. The result has established that various government institutions both national government level agencies, municipal level authorities and community and conservation groups are willing to promote urban green systems. However, activities of various institutions are inadequately coordinated to support cooperation of actors in maintaining urban green systems. This was because various institutions relied on the assigned roles and regulations to meet the goals of the specific institution. The existing regulations have further influenced cooperation of the institutions (national government level agencies, municipal level authorities and community and conservation groups) on one hand. On the other hand, resource distribution both human resources and financial support hampered the implementation of some maintenance activities. As some activities were not carried out accordingly such as establishment of non-destructive projects. Furthermore, there was limited human resources both natural resource and town planner officers to support day-to-day monitoring of urban green systems to overcome encroachment and degradation.

Urban green systems cannot fully be maintained with single actors or institution because it contains numerous resources connected to different institutions and regulations. This underscores the need for coordination of different activities taken by various actors to increase cooperation among them in promoting green systems. Again, the government needs to mobilize resources both human resources and funds allocation. Human resources are needed to assist monitor destructive actions which affect negatively urban green systems such as encroachment and degradation. The government needs to mobilize funds to support various activities necessary for supporting sustainability of green systems.

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9. Authors Contribution

Helene S. Francis developed the idea and drafted the paper, Makarius Mdemu and Ally Namangaya raised comments and revised the draft.

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11. ADITIONAL READING

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12. KEY TERMS AND DEFINITIONS

Maintenance: Means rehabilitating something or protecting from deterioration

Cooperation: means working together to support certain issue at stake

Urban Green Systems: Is a place in urban areas occupied by vegetation and water